

Les Forges du
Saint-Maurice
Their Historiography





LES FORGES DU SAINT-MAURICE:
Their Historiography

Louise Trottier

©Minister of Supply and Services Canada 1980.

Available in Canada through authorized bookstore agents and other bookstores, or by mail from the Canadian Government Publishing Centre, Supply and Services Canada, Hull, Quebec, Canada K1A 0S9.

L'original français, *Les Forges: Historiographie des Forges du Saint-Maurice*, paru aux éditions du Boréal Express Limitée, Montréal, est en vente en librairie.

Price Canada: \$11.00

Price other countries: \$13.20

Price subject to change without notice.

Catalogue No.: R64-81/1980-42E

ISBN: 0-660-10711-2

ISSN: 0225-0101

Published under the authority
of the Minister of the Environment,
Ottawa, 1980.

The opinions expressed in this report are those of the author and not necessarily those of Environment Canada.

**LES FORGES DU SAINT-MAURICE:
Their Historiography**

Louise Trottier

Translated by the Department of the Secretary of State

4	Foreword
6	Acknowledgments
7	Part I The Saint-Maurice Region - General and Specialized Studies
9	The Physical Environment
9	Land Area
11	Natural Features
15	The Industrial and Human Environment
15	Raw Materials
17	Regional Industries
19	Transportation
21	Population
23	Part II The Industrial Community of Les Forges du Saint-Maurice - Specialized Studies
25	Overview
25	Monographs of Benjamin Sulte and Albert Tessier
36	Retrospective Works
41	Industrial Structures
41	Under French Rule
47	Under British Rule
51	The Human Element
51	Biographies of Leading Figures
54	Portrait of the Society and its Beliefs and Attitudes
59	Part III The Iron Industry: A Comparative Study
61	Iron Industry in France
67	Iron Industry in Great Britain
73	Iron Industry in the United States
85	Conclusion
87	Endnotes
95	Bibliography

FOREWORD

On March 25, 1730, the King of France granted François Poulin de Francheville the right to mine the iron deposits located on his Saint-Maurice seigneurie. With this concession at last came recognition of the many requests with which the colonial administrators had been flooding the mother country since 1660 in regard to the mining of the ore in New France. Moreover, it meant the establishment of one of the first metallurgical industries in Canada, Les Forges du Saint-Maurice, which would be in almost continuous operation until the end of the 19th century.

Aware of the impact of this event on a developing country, several historians have concentrated on recounting the principal stages in the development of the ironworks. If one limits oneself solely to this point of view, the body of historical writings seems quite small; only some 20 works could be the subject of a historiography of the Forges du Saint-Maurice. However, the popularity of the subject in other disciplines, as shown by the large number of publications devoted to the Saint-Maurice area, prompted us to extend the meaning of the term "historiography." We felt it necessary to examine the fate of Les Forges in a broader context.

To this end, we studied close to 200 works: monographs on local history, government brochures, dictionaries, articles from periodicals and so on. In them we found analyses or descriptions from the viewpoints both of pure and applied sciences like biology, geology, metallurgy and technology and of social sciences like economics, ethnology and sociology. In compiling this material we were able to identify the major themes within which the industry of Les Forges might be considered, either formally or informally.

The first part of this historiography examines works dealing with the Saint-Maurice area from the point of view of the physical, industrial and human environment. In the second part, we study those works which look specifically at Les Forges. Since this venture was unique, we felt it would be useful to add a third part: a comparative study. We present typical examples from the iron industry in France and several industrial communities in Great Britain and the United States and try to determine the similarities and differences between them and Les Forges.

Within this framework, the role of historians comes alive. Who are they and what do they do? With reference to the disciplines already mentioned, we can identify three distinct groups. The first relates historical facts along socio-economic or genealogical lines. Included in this group are such writers as Benjamin Sulte, Albert Tessier, Joseph-Noël Fauteux, Hervé Biron, Marcel Trudel, Cameron Nish and Fred C. Wurtele. The second group, which includes Raoul Blanchard, Thomas Boucher, Napoléon Caron, Stanislas Drapeau and Dollard Dubé, among others, undertakes a more general study of Les Forges. The third group

is made up of scientists, some of the more noteworthy of whom are geologists Jacques Béland, Ernest Pageau and David J. McDougall and metallurgists James H. Bartlett, Fathi Habashi and Joseph Obalski.

There are clear differences in the approaches taken by these authors. It is probably not simply a coincidence that some of them actually come from the Trois-Rivières area. They no doubt wanted to draw attention to a place which was dear to them, and so wished to popularize their knowledge in order to reach a wide audience. Consequently, they organized their documentation, which was just as often from oral sources as from written ones, in an empirical manner.

A more scientific approach to history is also found. It reflects systematic research conducted in archives and libraries or in the field. These works provide experts with a variety of interpretations in the fields of political, economic, social, scientific and technological history which may be accepted or disputed and may give way to the findings of later authors.

Taken in this context, the historiography of Les Forges du Saint-Maurice therefore presents a wide range of possibilities. It remains to be seen just how accurately the development of this industry and its influence on 18th- and 19th-century Canada have been described.

ACKNOWLEDGEMENTS

This study was made possible through the co-operation of a team of researchers. I would therefore like to thank my colleagues in Les Forges project for having assisted me in gathering the material and allowing me access to the information centre so that I could check the sources in original manuscripts. A stay in Trois-Rivières enabled me to add many entries to the bibliography in this paper, and gave me the opportunity to meet Father Hermann Plante, curator of the Seminary archives, who made a number of original documents available to me. Similarly, I appreciate having met Father Fernand Porter, O.F.M. and Dr. Conrad Godin, to whom I am indebted for certain data on the population and the site of the Forges. Also important was the participation of Professor René Hardy and his regional history research group at the University of Quebec at Trois-Rivières, who gave me permission to consult their very rich bibliographic file. I would also like to extend sincere thanks to my father, Jean-Luc Trottier, for having given me considerable information on the technical installations and the history of the family foundry and to my aunt, Maria Beaumier-Paquet, who provided me with some photographic material from the beginning of the 20th century. Finally, I must mention the efforts of my colleague Pierre Dufour, who carried out a meticulous revision of this manuscript for which I am most grateful. I also express my gratitude to Lyse Gauthier-Harvey, who was responsible for transcribing the text.

PART I THE SAINT-MAURICE REGION - GENERAL AND SPECIALIZED STUDIES



THE PHYSICAL ENVIRONMENT

Land Area

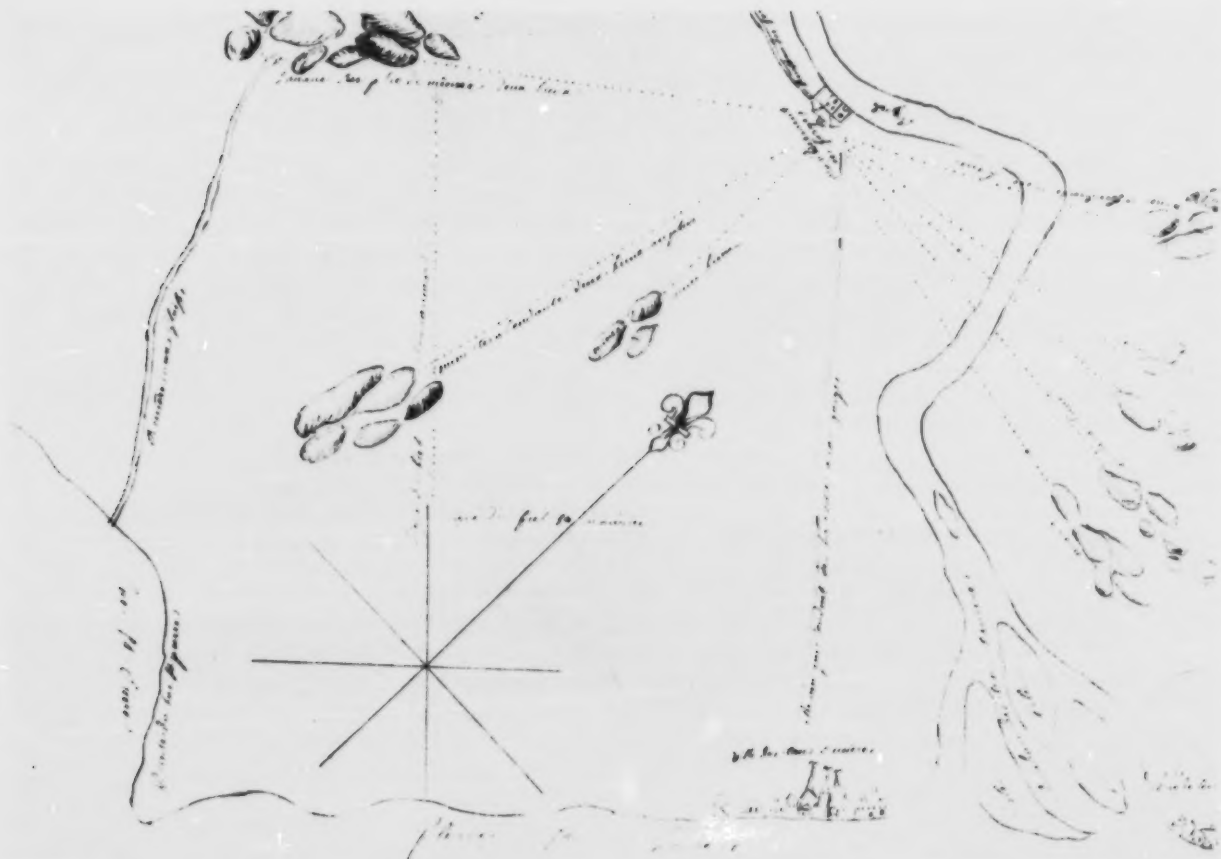
The most striking characteristic of the Saint-Maurice area is its vastness. In *Etudes sur le développement de la colonisation*, which appeared in 1863, Stanislas Drapeau¹ describes it as being 144 miles wide. He sets as its limits the counties of Maskinongé, Saint-Maurice, Champlain and Portneuf on the Saint Lawrence side and the 50th parallel north in the hinterland, giving it a total area of approximately 24,140 square miles.

In the 19th century, the Saint-Maurice Valley itself was the main area of settlement. The region received financial assistance from the government several times for the purpose of such settlement, especially between 1854 and 1862. Basing his work on the reports of government commissions and colonial agents, Drapeau reveals the progress and shortcomings in this regard, giving a detailed description of each of the counties mentioned above. The author first indicates the township boundaries in Maskinongé (Peterborough and Hunterstown) and Saint-Maurice (Caxton and Chaouénigane). He then describes the parishes in the regions involved, giving their real and projected boundaries, as well as the amount of land owned and cultivated. A table shows which counties or townships were offering lots for sale and what prices they were asking.²

Continuing in the same vein as Drapeau, Thomas Boucher picturesquely describes in *Mauricie d'autrefois*³ the gradual establishment of parishes in the upper and lower Saint-Maurice Valley. Many date from the middle of the 19th century, including Saint-Tite and Saint-Stanislas, which developed simultaneously in the Batiscan area. Other settlements, for example, Saint-Séverin and Saint Timothée, sprang up later in this region. The author points out that these parishes on the right bank of the Batiscan River had no boundaries in the unsettled areas to the north and northeast. He stresses the importance of the lumber industry and trade, which led to the establishment of other posts, in particular Les Grès, Saint-Mathieu and Sainte-Flore, and the opening around 1860 of new routes into the upper Saint-Maurice Valley, such as the road between Les Piles and La Tuque.

These same activities hastened the development of the town of Trois-Rivières, situated at the confluence of the Saint-Maurice and the Saint Lawrence. According to Raoul Blanchard in *Le Centre du Canada français*,⁴ the town was only a temporary summer camp and fur-trading post under the French regime and later remained a small administrative centre with no industrial base. A sleepy community on the banks of the Saint Lawrence, it experienced little growth until the end of the 19th century, when the first navigation on the Saint-Maurice River gave it new life.

Stanislas Drapeau explains where the Saint-Maurice begins and ends and identifies its tributaries: the Mataouin, the Makinak, the Bastonais, the Croche and Rivière aux Rats.⁵ There are several explanations as to the history of the river's name. According to Amour Landry in *Bribes d'Histoire*,⁶ the first name for the river was *Métabéroutine*, an Algonquin word meaning "exposed to all winds." He writes that it was later called *Fouez* or *Foix* by Jacques Cartier and Marc Lescarbot, a name which it kept until the 18th century, when it became *Rivière des Trois-Rivières*. Benjamin Sulte⁷ disputes the authenticity of Landry's sources and does not believe that these names were used for long. As Landry does later, Sulte states that the name *Saint-Maurice* was probably given in honour of Maurice Poulin de La Fontaine, who in 1668 was given a fief along the length of the river. After the Conquest, the English called it *Black River*. In the 19th century it was also called *Rivière des Cheneaux*.



Plan of "Forges de Trois-Rivières" in 1735. Note especially the road laid out by Francheville to connect Les Forges du Saint-Maurice with the city of Trois-Rivières, also the location of the bog-iron deposits. (Public Archives Canada, neg. C15782.)

Natural Features

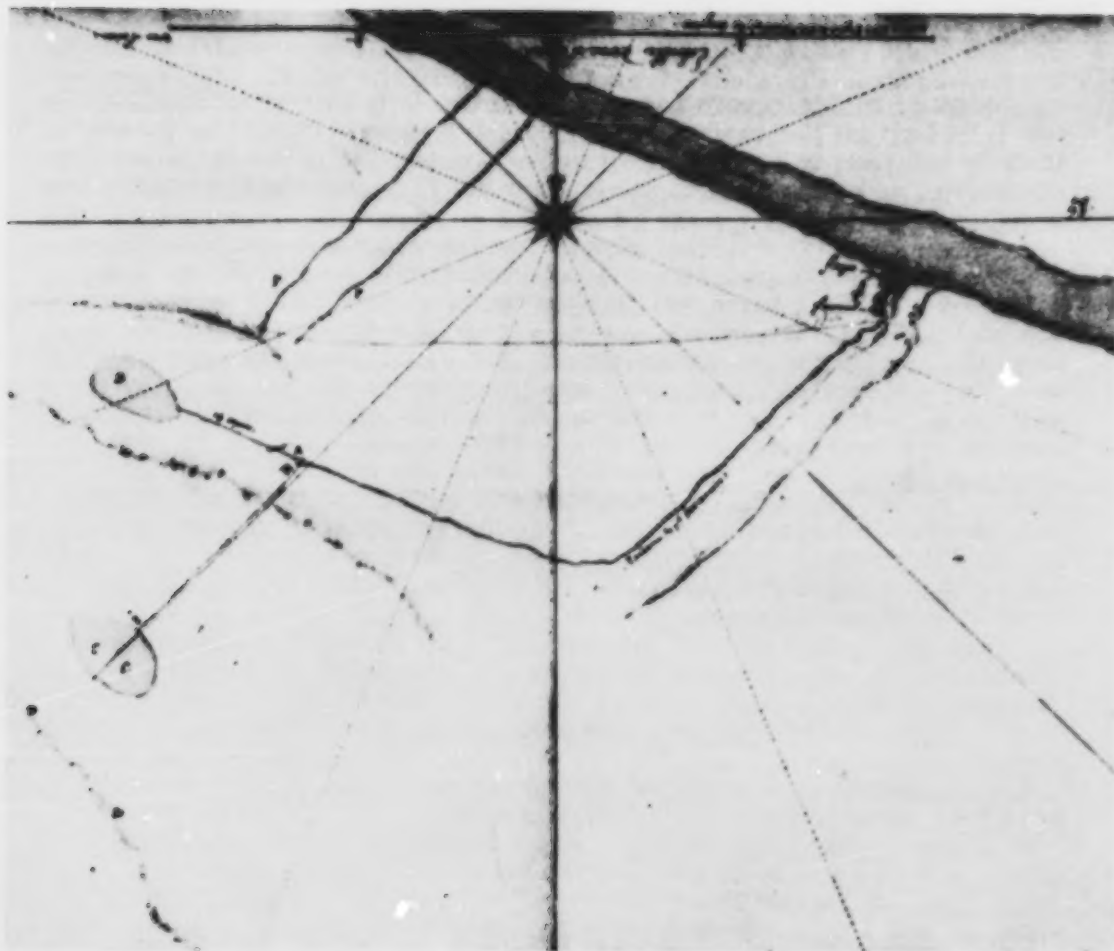
Because of its geographic position, the long Saint-Maurice River is the lifeblood of the region now called the Mauricie (Fig. 1). However, it does not seem to have been considered particularly important until the beginning of the 19th century, when the first scientific expeditions were made.

In a series of articles, Albert Tessier describes the expeditions of Joseph Bouchette in 1828 and Lieutenant Ingall in 1829.⁸ He does point out that this harsh and densely forested land had already been braved in 1651 by the Jesuit Jacques Buteux for the heroic purpose of evangelizing the tribes living there. The Jesuit does not seem to have been very interested in material matters, for his journal contains no mention of geographical features or the quality of the soil and subsoil. However, the apostolic fervour of the 17th century gave way to more worldly concerns in the 19th century. Using the explorers' journals, Tessier gives many details concerning the geological features, climate, soil quality and flora and fauna of the area. He also recounts the explorers' comments on the hydrographic system, particularly the rough waters of the Saint-Maurice, with its many waterfalls and rapids and their picturesque toponymy.

Tessier finds Ingall's observations more scientific than those of Bouchette. He explains the dark colour of the water in the river, referred to on many maps as Black River, by the presence of syenitic rock and gives more technical descriptions of the Grande-Mère, Shawinigan and Rivière aux Rats waterfalls. The two expeditions together provide a general description of the region's physical features.

Although the Saint-Maurice region is located in the centre of Quebec and has access to the many routes connecting the town of Trois-Rivières to the large commercial centres, it was still little known at the end of the 19th century. This is evident in a study published by the Canadian Department of Agriculture in 1887.⁹ Of a total of approximately 14 million acres, the report shows only 3 million as being fit for settlement, mainly because of the rough terrain. It would therefore be impractical to hope to establish agricultural parishes like those on the banks of the Saint Lawrence. Industrial development is seen as desirable, however, because of the area's abundant natural resources: water power, forests of conifers and other valuable wood, and iron ore.

The report next discusses the hydrological and hydrographic characteristics of the Saint-Maurice River and its tributaries, stressing the navigational possibilities. It then describes the main settlements along the river and in the northern reaches of the area - for example, Cap-de-la-Madeleine, Trois-Rivières, Saint-Tite, Mont-Carmel, Saint-Boniface de Shawinigan, Sainte-Flore, Saint-Jacques-des-Piles and La Tuque - with specific reference to the type of soil, water power, total population, existing and embryonic agricultural or industrial activities and commercial potential of each. In order for the area's resources to be exploited fully, the government would need to be backed by the powerful forces of industry and settlement. The conclusion of the report is that the country could achieve positive results if this patriotic goal were to be pursued.



Les Forges du Saint-Maurice in 1738. Sketched by surveyor Louis Champoux, this plan shows the buildings erected by Cugnet Company between 1736 and 1738. (Public Archives Canada, neg. C54550.)

Basing his opinions on the above report, from which he quotes at great length, Napoléon Caron writes in *Deux Voyages sur le Saint-Maurice*¹⁰ that he also believes that a combination of those "deux forces vives" - agriculture and industry - would do marvellous things for the future of the Mauricie region. He opposes government measures to maintain forest reserves, a great obstacle to settlement. He draws attention to the presence of abundant waterpower and minerals - for example, the iron in Montagne de l'Oiseau and the marble in Ile-aux-Noix - and denounces the lack of transportation routes preventing rational exploitation of these resources.

Whether they bear the imprint of a Mauricie author or take the form of a government publication, most of the above 19th-century studies are strongly in favour of intensive regional development. However, it is

more than a century later before this development is conducted in a more scientific manner. Raoul Blanchard's description of the physical environment in Mauricie¹¹ is evidence of this.

The first subject dealt with by the author is that of relief. The Mauricie region is like a large plateau, a peneplain formed only recently, in geological terms, the surface of which is covered with hard rocks. Blanchard explains how the coming of the glaciers and, after their departure, the flooding of the area by the Champlain Sea caused these changes in the earth's surface, namely, the terraces formed from sand and clay deposits found in the Saint Lawrence Lowlands.

Using information collected over a period of ten years, between 1926 and 1935, and observations made at eight weather stations between Shawinigan and Joliette, the author describes the climate for two seasons: winter and summer. He calculates the mean winter temperature and the temperature variation in the summer months. He also points out that the harsh climate does not seem to discourage plant growth, as there is a great deal of dense vegetation. Forests suitable for harvesting cover 86.4 per cent of the area. North of the 47th parallel, boreal forest dominates the bleak landscape. Conifers such as balsam fir, jack pine and larch are prominent and are joined by deciduous trees like white birch, poplar and trembling aspen. Further south there is far greater variety, including other conifers like white pine, red pine and cedar and hardwoods like yellow birch, maple, black ash and basswood. All this vegetation might be termed oppressive were it not for the fact that the population derived most of its income from forestry.

The information provided by Blanchard is completed by a highly specialized monograph which appeared in 1967, in which Ernest Pageau presents a pedological study of the counties of Trois-Rivières and Saint Maurice.¹² In the first part of the work, the author describes the location, size and main routes of the entire area. He then gives a general picture of the geological formation of the bedrock and analyses the surface deposits which characterize the two natural regions, the Saint-Lawrence Plain and the Laurentian Plateau. Like Blanchard, he points out that the boundary between the plain and plateau deposits varies according to the relief, shape and stratigraphy of the land. The Saint Lawrence Plain is divided into three zones: recent alluvial and marshy deposits on the banks of the river, a deposit of Champlain clay and a vast sandy plain at the Saint-Maurice delta. The Laurentian Plateau has a mountainous border which is deeply indented by the Shawinigan Valley. The author goes on to briefly describe the hydrographic system of the counties studied.

Aware of the influence which climate has on the formation and development of soils and plants, Pageau continues Blanchard's testing and determines the temperature and precipitation conditions in the area. Working from information collected at four weather stations located in the four natural regions involved, he calculates the mean temperatures in accordance with monthly variations. He concludes that there is little difference in climate between the plain and the plateau. He reaches the same conclusions as Blanchard and follows his lead in determining the influence of the climate on the different types of vegetation.

Following this study of geological and climatic factors, Pageau begins a more detailed study of the soils, giving their genetic

classification according to age, degree of humidity and mineral or vegetable content. He studies their morphogenesis and profiles and establishes a tabular classification according to parent rock and drainage conditions. This is followed by a detailed analysis of the soils of the plain and plateau, based on the influence of alluviums on the formation of the characteristic deposits. Finally, the author makes a comparative assessment of the soils with regard to their agricultural potential. In accordance with his definition and interpretation of the various classes, he determines the factors involved in land development and identifies the regions which have the most potential.

The geophysical contribution made by Blanchard and Pageau is of great importance to continuing research on the region's environment. To this research might be added a systematic study of the forested areas in regard to the proportion in which the various types of trees are present, their size, the possible combinations of types and the time required for their growth. Like Emmanuel Leroy-Ladurie, researchers might include observations regarding climatic changes over the ages and the probable existence of a short ice age and its effect on changes in soil, flora and fauna.¹³ For all practical purposes, these elements - climate and the composition of the earth's crust - are responsible for the scarcity or abundance of the raw materials whose exploitation leads to the creation of a new, industrial environment.

THE INDUSTRIAL AND HUMAN ENVIRONMENT

Raw Materials

With colonization came the first somewhat tentative forest clearing in the Saint-Maurice region. As available land was becoming hard to find in the parishes along the Saint Lawrence River, at the beginning of the 19th century farm settlements began to spread out along the Batiscan and Saint-Maurice rivers. In order to make profitable use of the trees felled in the land-clearing process, the habitants burned the timber to extract potash and pearlash, which were then shipped to England. Blanchard¹ describes this kind of economic activity as extensive and notes that it would have been more advantageous if the trees had instead been converted into planks or sawn timber.

The Continental System imposed by Napoleon in 1806 provided an impetus to the timber industry in the area. Like the Outaouais region, the Saint-Maurice region aroused the interest of British traders; as early as 1829, the members of the Ingall expedition noticed logs floating on the Petite Bostonnais River. However, Blanchard is of the opinion that, despite the timber potential of the Saint-Maurice region, logging remained an activity, limited in volume and scope, mainly because of the rapids which made the Saint-Maurice River a most difficult waterway.

For this reason, there were a number of government measures adopted between 1847 and 1851 aimed at subsidizing the building of log booms and chutes on the river. After 1852 it thus became possible to exploit the region's vast forest resources in a systematic fashion. The author reports on how this development proceeded, with the establishment of logging camps in the parishes around Shawinigan by English investors such as the Gilmours of Quebec City and the Baptists of Trois-Rivières. He reveals the cruel methods used by the clearing crews and the carelessness which inflicted a great deal of waste in the forest. Using Pierre Dupin's monograph, *Anciens chantiers du Saint-Maurice*,² Blanchard also describes day-to-day activities in the logging camps.

From its beginnings, the logging industry was a prime source of income in the Saint-Maurice region. The first part of the Department of Agriculture report³ deals with the lumber trade on the Saint-Maurice River, analysing its economic impact. According to official reports on Crown lands, stumpage dues alone could amount to \$50,000 annually. Information provided by the Trois-Rivières Chamber of Commerce mentions the first somewhat superficial land surveys carried out in 1825, the more systematic regulations of 1852 which set out land boundaries and the fees and costs involved in the construction of log booms and chutes. American and British firms subsequently established a number of sawmills in the Trois-Rivières vicinity. The report also estimates annual log production on the Saint-Maurice River and its tributaries, pointing out

that the development of commercial activity was made possible by timber which could be transported on the river. However, it adds that other kinds of timber were nevertheless significant in terms of commerce, including the tamarack used in the construction of railways, firewood and the hemlock bark used in tanneries. It also includes a list of projects associated with the development of the river, an estimation of the expenses involved and a description of where the main log booms were located, their structural forms and their dimensions.

Such information is also available on the dam at Les Grès where George Baptist established a sawmill in 1846. Thomas Boucher⁴ relates a number of interesting details, first with respect to how the sawmill operated. With regard to the technology employed, he describes the various saws used and the main steps involved in the sawing process. He also provides information on the timber's origin and quality, its export to foreign markets and the gradual depletion of white pine stands.

Mineral resources seem to have been a second attraction in the Saint-Maurice region. The brochure published by the Department of Agriculture⁵ attributes the very limited information on this subject to the fact that little geological exploration had been done, but states that considerable quantities of iron were present in the area; it indicates where the main iron deposits were located and describes in detail the iron ore found in the bog deposits.⁶

Other types of ore were present in the area, such as quartz and feldspar in gneiss formations north of Matawin, lead, copper and iron pyrites near the Trenche River and nickel and cobalt in the syenite formations beyond Cap-de-la-Madeleine. Also noted is the existence of a number of sandstone and marble quarries in the Saint-Tite region and limestone quarries in the Saint-Maurice parish. Based on the work of William Logan, E.Z. Massicotte, in his work entitled "Historique de la paroisse de Saint-Maurice, comté de Champlain,"⁷ observes that there was seepage of oil between Rivière-au-Lard and the Grondin mill and that these oil deposits probably had their source in the large peat bogs between Lac-à-la-Tortue and the Forges du Saint-Maurice. These same peat bogs were the source of the bog iron ore used in the foundries of the Trois-Rivières region. In their economic study of the geology of Quebec, S.A. Dresser and T.C. Denis⁸ claim that this ore could be found both in the vicinity of the Saint Lawrence River and in the valleys of its tributaries; they provide a description of the deposits at Lac-à-la-Tortue based on an examination in 1890 by A.P. Lowen. They also analyse the composition of the ochre found in large quantities in Saint-Maurice and Champlain counties, identifying the main deposits and the firms which worked them.

In a geological report which appeared in 1961,⁹ Jacques Béland presents a historic and physiographic sketch of the Shawinigan region and Saint-Maurice, Champlain and Lavolette counties. He also discusses tectonics, or earth stratification and folds, and, in a last section dealing with economic geology, he defines the difference between bog iron ore and that from lake deposits. He bases his statements on chemical analyses of these two kinds of ore, especially specimens discovered in the Grondin deposits.

Regional Industries

Because of the richness of the Saint-Maurice subsoil, many industries were established in the region over the course of the 19th century. In a brief retrospective, James H. Bartlett¹⁰ discusses the Radnor, Batiscan and Islet ironworks. He gives a short description of their locations, the industrial buildings and the items produced, using as his source reports prepared by Joseph Bouchette in 1832 and the Geological Survey of Canada in 1863. He briefly surveys a number of other iron industries located both in Quebec (Hull, Yamaska, Grantham, Baie Saint-Paul, Rivière Moisie, Quebec City and Montreal) and in the rest of the country (Normandale, Halifax and Pictou, among others). However, it should be mentioned that the information provided by this author on economic aspects is more interesting: he includes numerous tables indicating the yearly consumption of iron and steel in Canada between 1868 and 1885 and categorizes the main imports and exports of manufactured products: rails, household goods, hardware and heavy machinery.

Production at the Batiscan ironworks is also of interest to Michel Bibaud. A small article which appeared in 1825 in *Bibliothèque canadienne*¹¹ cites Bouchette in a description of its structure, main buildings and products. However, Bibaud points to the progress made in the manufacture of stoves, which were less likely to develop cracks at high temperatures than those imported from England and Scotland. The historic aspect of this ironworks is discussed by E.Z. Massicotte.¹² In a short article, he relates the main stages of its development under two administrations, that is, from its beginnings in 1794 until 1800 and from 1801 to 1812. He provides short biographical notes on its owners, Thomas Dunn, John Craigie, John Frobisher and Thomas Coffin, and mentions the names of a number of employees, including John Slicer and Jonathan Wead, who were metallurgists brought over from England, and another who was apparently a caster from the famous Michelin family and who later worked at Les Forges du Saint-Maurice. Massicotte also provides information on the ore, the industrial buildings and production and attributes the gradual decline of the industry to high operating costs and transportation problems.

The Grondin mine belonged to this category of short-lived industries. Located on lots 22 and 23 of the seventh concession in Shawinigan township, according to Thomas Boucher¹³ it represented one of the richest iron deposits in the province of Quebec in about 1875. He uses as a source a report by the federal Department of Mines which appeared in 1917 and indicated the location and composition of the ore. Boucher also relies on oral history in tracing the ancestors of the promoter, Hyacinthe Grondin, who worked at the Vieilles Forges during the time of McDougall. He describes the eventful history of the ironworks, from the advertising methods used in raising capital to the firing of the blast furnace in 1877. He then seeks to explain the reasons for its failure, attributing it mainly to the hardness of the metal and the fact that there were no metallurgical engineers with the knowledge required to refine the ore. For Thomas Boucher the history of this industrial site was almost a real-life experience. He visited it in 1905 and was able to locate the main ruins, which could not be seen



Les Forges du Saint-Maurice in 1842, seen from the bank of the river Saint-Maurice. (Watercolour by Mary Millicent Chaplin, Public Archives Canada, neg. F280.)

in the dense bush in 1944 when he returned in the company of a group of botanists.

It was also the lack of technical knowledge which apparently led to abandonment of the Islet ironworks in 1879. At any rate, this is the claim made in a short account by W.J.A. Donald in *The Canadian Iron and Steel Industry*¹⁴ retracing the main stages in the history of the ironworks from the time it was founded in 1856.

A great deal of material exists on the Radnor ironworks, which was in operation from 1854 to 1910. Several retrospectives including those of J.-E. Bellemare¹⁵ have been excerpted from newspapers of the time, and government reports provide a comprehensive look at the development of the works from the point of view of its location, its administration, the ore used and its products, and determine the reasons for its shutdown.

Accounts from an international convention of mining engineers held on this very site in 1893 provide a wealth of fascinating administrative and technical details on the operation of the ironworks from its early days. The authors justify the choice of the site and its raw-material potential in terms of timber and bog ore. They then deal with the technological aspect as such, namely charcoal production, and include a

quantitative and qualitative description of each machine used in the foundry: its construction, dimensions, functions and so on. The economic details relate to the items produced, the work and the manpower. The authors conclude with an analysis of the problems which caused the ironworks to reduce production and thus fall behind their counterparts in the United States which operated on a similar scale.¹⁶

A more recent article by David McDougall in the *Canadian Mining Journal* in 1971¹⁷ retraces the growth of this ironworks and the various administrative changes from 1861 to 1908, when the Canada Iron Company was formed. McDougall's article discusses in greater detail the various types of iron ore - noting the difference between bog iron ore and ore from lake deposits - the transformation of ore in a blast furnace and the products which were subsequently manufactured and emphasizes that the Radnor ironworks was one of the last industries in the area to use charcoal for fuel.

A number of writers deal with the production of charcoal. Prosper Cloutier reports in his *Histoire de la paroisse de Champlain*¹⁸ the techniques used in this process. Marcel Pratte¹⁹ observes that in the 19th century production was transferred from Saint-Etienne-des-Grès to Saint-Boniface. They also provide ample information on cottage industries such as those involving flax, maple syrup and snowshoes. Stanislas Drapeau²⁰ estimates the amount of butter, maple sugar, wool and other fabrics produced in the counties of Maskinongé, Saint-Maurice and Champlain in 1863; Thomas Boucher²¹ discusses the potash works in Saint-Boniface, the making of "cassots" or birchbark containers, the use of hemlock bark in tanneries in such places as Saint-Etienne and Sainte-Flore, maple sugar production and the combined flour and saw mills located along the Yamachiche and Shawinigan rivers and at Saint-Jean-des-Piles, some of which also had wool-carding machines.

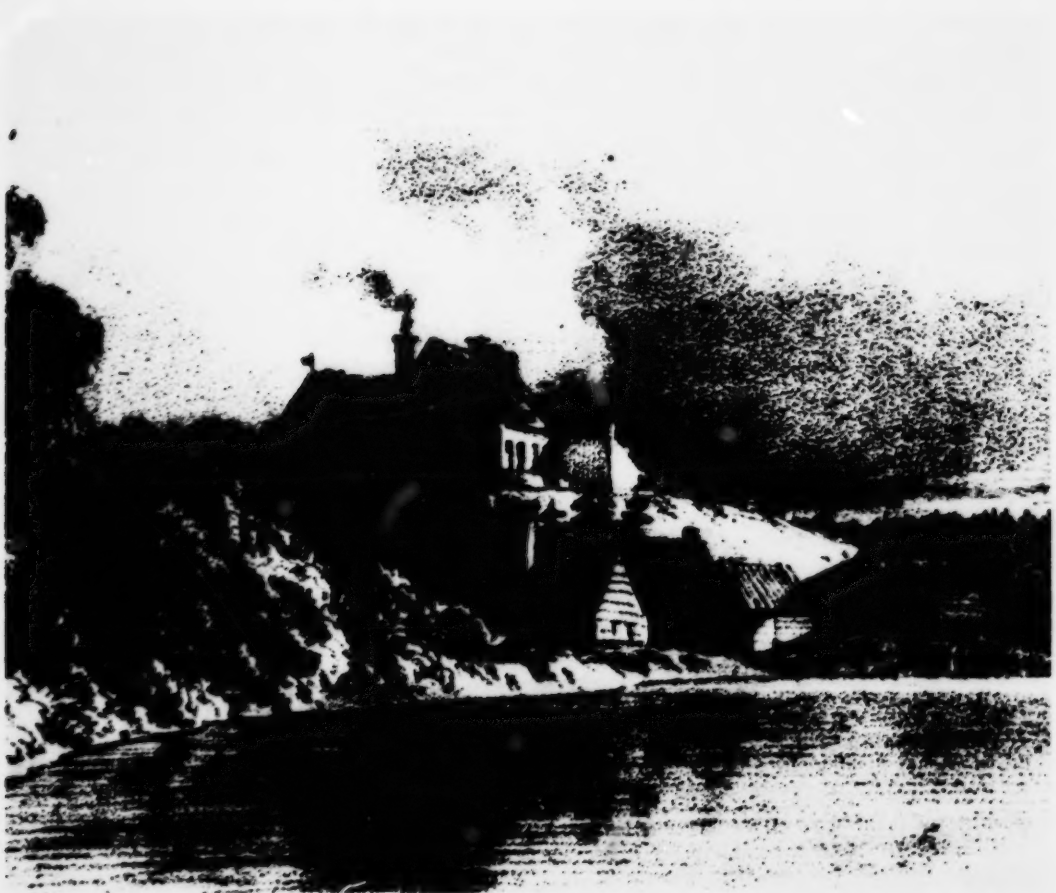
Transportation

In order to remain viable, both large and small industries must be able to deliver their products to local, regional, national or even international markets; for this reason they are highly dependent on an organized transportation system. Thomas Boucher²² stresses that had the Sainte-Maurice River been navigable as far as La Tuque, the Saint-Maurice region would have had too easy a fate; the obstacles strewn along the waterway destined the area for a better future; generations of white men had to adapt to hardship before they were allowed easy access to the very source of the river in the early years of the 20th century. Boucher lists the means of transport once used on the river: first birchbark canoes, then the raftsmen's barges introduced when logging began and finally the barges used to haul horses and goods and which, on occasion, may have been pulled along by means of towlines. He comments on the way the construction of these last two types of craft changed and specifies the kind of freight hauled. Based on accounts of older informants living at the time, he relates a number of incidents in the adventurous lives of the men involved in these tremendous hauling operations; he describes the region served, the relay crews and the

difficulties they had to overcome.

Gradually, with the introduction of the steamship, navigation on the Saint-Maurice River became easier. Napoléon Caron describes at length the steamship put into service by the American firm Norcross and Philipp in 1856 and the *La Galissonnière*, launched in 1879 with the help of provincial government subsidies, while lamenting the fact that these two ventures failed.²³

The development of land routes, closely linked with settlement, accelerated toward the end of the 19th century. In fact, the Department of Agriculture points out that large expanses of fertile land were still available in the region northwest of Trois-Rivières toward the Mattawin Valley. In order to attract settlement and industry, railway lines were built. The department's brochure describes the route of the railroad connecting Trois-Rivières and Les Piles and the railroad in the Saint Lawrence lowland area connecting Trois-Rivières, Quebec City and Lac Saint-Jean.²⁴



Les Forges, seen from the Saint-Maurice River in 1842. Drawing by Joseph Bouchette Jr., showing "la Grande Maison" and the complex of the lower forge. (Public Archives Canada, neg. C4356.)

Population

Secondary sources provide very little quantitative information on the population shift toward these new areas of settlement. Of course frequent reference is made to the formation of new parishes in the hinterland regions toward the end of the last century, but little is known about emigration and land-occupancy rates. Some historians do provide data on the 17th and 18th centuries. In his *Chronique trifluvienne*,²⁵ Benjamin Sulte gives an annotated list of settlers according to the date of their arrival in Trois-Rivières beginning in 1634, mentioning their places of origin, ages and occupations, the number of marriages and burials before 1665 and the places in which they settled. Although the author does not cite his sources, this list is worth consulting.

Along the same lines, a work by Antoine Roy²⁶ includes a census of the town and government of Trois-Rivières taken at Amherst's orders in September 1760. It mentions the names of those who lived there at the time, those who died and those who moved to other parishes up to March 1762. Thus two accounts are available - one for 1760 and another for 1762 - of the population in this area, which at that time included Trois-Rivières and the immediate area and the nearby parishes, from Maskinongé to Sainte-Marie on the north shore of the Saint Lawrence and from Yamaska to Saint-Pierre-les-Becquets on the south shore.

Certain studies provide partial data on the population of a number of parishes in the Saint-Maurice region. Prosper Cloutier²⁷ uses the Champlain parish registers to make a few comments on baptisms and marriages at the beginning of the 18th century and to provide data on the distribution of land in 1738. He also cites extracts from the records of the notary Louis Gillet containing the names of former and current landholders and the location and size of their holdings for the years 1817 to 1830. In his monograph entitled *La paroisse de Champlain*, E. Hamelin²⁸ presents the survey done by the notary Martineau on the La Visitation parish in 1852. This quite comprehensive document provides information on the number of inhabitants, their ethnic origins, religion, social and occupational status and education, the 1851 harvest and cottage industries.

For his part, Thomas Boucher²⁹ provides a more original description of day-to-day activities carried on in an industrial community in his discussion of certain aspects of village life in Les Grès at the peak of its prosperity in about 1860. He describes its industrial buildings and houses especially those set aside for workers. This isolated community depended entirely on its administrators for housing and food. There is no mention of public services or educational facilities, and its inhabitants, who were lumberjacks and farmers, relied on the services of a missionary based at Les Forges du Saint-Maurice until the Saint-Etienne parish was established in 1858.

The inhabitants of the Saint-Maurice region were also described in a rather vivid fashion by passing travellers. Albert Tessier's work³⁰ includes extracts from an article by Miss Faith Fenton which appeared in the Toronto newspaper *The Empire* in August 1874. Following a stay in the upper Saint-Maurice Valley and in Trois-Rivières, this journalist writes, in a humorous vein, about the customs and beliefs of the people. However, her tongue-in-cheek style

did not happen to please the residents of Trois-Rivières, who took her remarks too seriously. Tessier selects some relevant information on the natural environment and some less disparaging material dealing with religious ceremonies.

The observations on the industrial and agricultural development of the Saint-Maurice Valley form a sort of vast descriptive panorama which, if some parts are examined microscopically, may have all the eloquence of an 18th-century conversation picture. The exploitation of raw materials in vast quantities raises problems with regard to animal and plant life and mineral resources. These are seldom an issue in the works analysed. And the sporadic observations included on the industry's establishment deal only with its major stages. Should a historical approach not also deal with ecological considerations so that one might assess the impact of industrialization on the utilization of mineral deposits, forests, people and animals - in short, on the gradual depletion of resources and its effect on the human milieu?

Aside from a handful of population surveys, society is practically ignored and the human environment seems to be reduced to its simplest terms. More information on the migration and daily activities of this population, its education, its leisure-time activities, its beliefs and its attitudes would be welcomed. It would be useful if the history of the Saint-Maurice region were not still available solely in bits and pieces, scattered in all directions, but could be found in one coherent account flowing as smoothly as logs rolling down the chutes along the Saint-Maurice River.

Our discussion will now turn to how this environment aroused the interest of a number of historians who have dealt with the factors which determined the course of development of one of Canada's first iron and steel industries, Les Forges du Saint-Maurice.

PART II THE INDUSTRIAL COMMUNITY OF LES FORGES DU SAINT-MAURICE -
SPECIALIZED STUDIES

OVERVIEW

Monographs of Benjamin Sulte and Albert Tessier

Literature dealing specifically with the history of Les Forges du Saint-Maurice is limited. Few historians recognized by contemporary historiography have taken up the subject; most of the existing works were written by individuals with extremely varied motives rooted in professional interests or in feelings for their native Trois-Rivières area. These writers include chroniclers, documentalists, genealogists, mining engineers, geologists and others - all bent on retracing, with their own perspectives and methods, the important stages in the history of this undertaking from economic, political, social and physical points of view.

Monographs on Les Forges are scarce; in fact, there are only two: one by Benjamin Sulte, published in 1920,¹ and one by Albert Tessier, which appeared in 1952.² These two authors command our attention from the start because of the scope of their works and the very special manner in which they identify and group together the events which shaped the story of Les Forges du Saint-Maurice.

Sulte lays considerable emphasis on a chronological approach and begins his account by introducing the Poulin family. The seigneurie northeast of Trois-Rivières granted to François Poulin in 1676 would be considered the main site of Les Forges du Saint-Maurice in the 18th and 19th centuries. He then goes over the main stages in the history of Les Forges, finishing with a brief list of the last few owners from 1846 to 1883. On the whole, his monograph is rich with details on many different subjects such as the land, the environment, the industry itself from technological, economic, political and administrative points of view, the buildings and the people and their mentality.

For example, Sulte recounts the events preceding and following the concession of the Saint-Maurice seigneurie, the transactions connected with the delimitation and addition of new fiefs such as Saint-Etienne and Cap-de-la-Madeleine, the regulations applying to conservation of the surrounding forests and the discussions involved in the extension and distribution of properties in the 19th century. The importance of this region lay in its abundant iron ore resources.

Sulte notes that these resources were mentioned as early as 1650 in the writings of Marie de l'Incarnation and Pierre Boucher, and gives an account of the repeated steps taken by colonial authorities, beginning in 1668, to have samples analysed in France and the ore exploited. However, almost no action was taken by France until 1730 when mining rights were granted to François Poulin de Francheville and it became possible to establish an industry.

Sulte points out that the manufacture of iron is a very complicated industry and describes the process (the mining of the ore, its handling

costs, the role of raw materials and the making of charcoal) and how it was carried out at the Forges, including the type of ore used, the operation of the blast furnace and use of water power to run the ironworks equipment. The construction dates of buildings (and sometimes their dimensions) are given, together with a description of the site in 1752 based on comments made by Louis Franquet, a visitor. Descriptions of buildings such as the master's house, the church and some of the workers' and managers' houses are taken from inventories like the one made by Hertel de Rouville in September 1760 or from oral accounts recorded in 1860 and 1875.

In addition to technological and physical details concerning the establishment of the industry, the author presents information on its administrative organization. Several chapters are devoted to the Ancien Régime and mention the companies formed to operate the Forges. In the case of the first company, the one formed by Francheville on January 16, 1733, little information concerning operations and the causes of its dissolution is given. However, the name of the widow Thérèse de Couagne-Francheville is found on the list of the members of the company. Sulte therefore sets the date of the entrepreneur's death back to November of the preceding year. He jumps almost immediately to the formation of the second company by François-Etienne Cugnet on May 15, 1736. He reports the privileges obtained by its members, including the addition of the Saint-Etienne seigneurie to Les Forges lands and the obtaining of new conditions for borrowing from the royal treasury, and stresses the smooth operation of the enterprise under Cugnet's management.

However, the official correspondence for the year 1740 reveals that the company was starting to encounter financial difficulties. The author attributes them mainly to Cugnet, although he allows that the latter was not fully responsible given the imperialistic government structure within which he operated. A statement of the company's accounts and a table of the administrator's debts help show the causes of the 1742 bankruptcy. Thus in 1743 the Forges du Saint-Maurice reverted to the Crown and remained Crown property until 1760.

Sulte reviews the series of administrations after the Conquest: the military regime under John Bruyère and Frederick Haldimand, and then the period of the first leaseholders, placing special emphasis on the roles of Christophe Pélissier and Pierre de Sales Laterrière. Then follow a few brief observations on the management of Alexandre Dumas and Conrad Gury and more detailed information on the accomplishments of David Munro and Matthew Bell, from 1793 to 1845. Sulte briefly mentions the owners in the final years, from 1846 to 1883, and notes the gradual decline of Les Forges which began in 1810.

The monograph also describes how management affected operations, labour and production at the ironworks. In several places Sulte reports on the hiring of workers during the French colonial period and makes quite interesting observations on the earliest ironworking trades practised by Canadians. He deplores the scarcity of specialized workers; most of the time, especially around 1750, soldiers and farmers had to work at two jobs. This leads him to the subject of wages, considered low in 1754, and working conditions - for example, certain traditional practices continued by those working around the blast furnace until the mid-1800s. The production figures for the ironworks are based on inventories made by Hertel de Rouville in 1760 and Matthew



A pilgrimage to the site of "la Grande Maison." Seated in the centre, Monseigneur Albert Tessier, one of the historiographers of Les Forges du Saint-Maurice. (Archives du Séminaire des Trois-Rivières.)

Bell in 1833. The accounts of travellers such as Peter Kalm, Louis Franquet and John Lambert throw light on the characteristics of the ore used at Saint-Maurice and the quality of the finished products.

However, it is in the area of politics that Sulte gives us a more personal view. The bankruptcy of François-Etienne Cugnet provides an excuse for launching into a rather harsh criticism of the French colonial system. In his opinion, France kept much too tight a rein on her colony, thus hindering its economic development. The metropolis promoted the fur trade alone at the expense of all other economic activities, since this trade supplied the revenue needed to pay the colony's administrative expenses. Furthermore, all attempts to establish private undertakings were systematically halted, for fear these undertakings would compete with French ones. Granted, there were some innovative colonial administrators such as Charles de Beauharnois and Gilles Hocquart, but their limited freedom of action prevented them from putting New France on the path to more rapid economic development. It is therefore no surprise that Sulte greets the period following the Conquest with a sigh of relief. In his opinion the military regime, far from being oppressive, proved more tolerant than the French regime, since William Pitt wanted the Canadians to be satisfied with the new government and consequently tried not to upset them.

Sulte sees Christophe Pélissier as a supporter of the popular will and the democratic ideal as advanced by the Englishman John Wilkes; paradoxically, Sulte feels that Pélissier supplied artillery parts to the invading Americans not because he sympathized with their ideas concerning political freedom, but only because he wished to oppose England. In contrast, Pierre de Sales Laterrière is a model of loyalty to absolute monarchy. This is what one concludes from his *Mémoires*, which are used liberally by the author who nevertheless questions their authenticity and harshly criticizes Laterrière's administration.

Matthew Bell's management does not escape the author's censure either, and an opportunity is provided when he discusses an 1833 debate in the Legislative Assembly. Several politicians from Trois-Rivières, including Pierre Vézina and Doctor Kimber, reproached the director of Les Forges for monopolizing a large part of the land surrounding the ironworks, thereby preventing settlement of the Saint-Maurice hinterland. Sulte believes that these objections were rooted solely in political fervour. To their way of thinking, Bell was a bureaucrat enjoying privileges with which the Legislative Assembly was constantly doing battle. The position of the representative from Trois-Rivières could be compared to that of the members of an oligarchy existing in England at that time who occupied the senior administrative posts. This group was opposed by the liberals or "Whigs." In Canada, the term "Whig" signified a patriot or reformer and thus could be applied to Bell's adversaries, Judge Vallières de Saint-Réal, Pierre Vézina and others who joined with them in taking a stand against privilege. Sulte gives Bell credit for auctioning off some lots to settlers, but feels that Bell's claims that the land was poor were exaggerated.

Another of the author's favourite subjects is the people, their background and movements. Throughout his monograph are numerous genealogical references, including information on the Poulin family from 1644 to 1730, the earliest families at the ironworks (1737-40) and the shareholders and some of the directors of the various companies. As for statistics, the author mentions in several places the records of the

town of Trois-Rivières or of the church at Les Forges (for example, for the period 1746-53), census results such as those for 1760 and 1765, and population lists for 1820, 1832 and 1842.

Sulte also discusses the mentality of the people. He reports, without going into detail, the several orders issued regarding workers at the ironworks in 1737 as well as certain trials (the trial of Etienne Canteret in 1745 and that of Jacques-Philippe Dalphins (Dolfin) in 1753). Vivid childhood memories prompt him to write of the high social life led by Bell in Quebec City and Trois-Rivières and to describe the 19th-century village and society in picturesque terms. In several places he mentions the visits of the missionaries who served the village from its earliest days until about 1920. Benjamin Sulte's study is full of personal recollections and information gathered from various people living in this industrial community. In the preface, Gérard Malchelosse tells us that the author spent his earliest years there and began to describe the community in 1869, when it was still fully active. The fact that he comes from this region is thus one of the main motives behind his attempt to make the reader realize the importance of a disappearing industry, at least from a historical point of view.

Adieu mes vieilles Forges. Je vous ai connues dans votre splendeur et je me promettais, dès lors, de vous donner place dans notre histoire. J'écris ces dernières lignes en face de vos ruines qui bientôt disparaîtront. Déjà votre souvenir n'est plus qu'une légende vague dont la prochaine génération ne saura rien. Je veux vous sauver de l'oubli, vous faire revivre dans l'âme des Canadiens qui s'attachent à l'étude des temps passés....

This statement characterizes the approach taken by classical historiography, which aims at making an event and the recounting of that event correspond. When the two correspond perfectly, the historian has come as close as is possible to historical truth, which is the supreme goal to which all his activities are directed.

In this search for truth the historian has two sources for exploring reality: the direct experience of what he has seen and indirect knowledge gained from reading. Only rarely may he depend exclusively on one of these. Hence the dilemma facing the historian: which should be given priority - personal experience or documents? This epistemological decision will influence the entire structure of his work. Sulte does not first call on his experience as a local resident, but proceeds using earlier documents. For example, when he discusses the iron industry he includes some personal recollections but supports them with excerpts from Kalm and Franquet. A formula balancing observation and knowledge is strictly followed.

The outline of his work is empirical. He proceeds chronologically for the most part, drawing up a year-by-year list of events from 1644 to 1883 without analysing them. The study as a whole is therefore based on anecdotal narration and is teeming with scattered, somewhat disjointed notes to which a historian favouring a more scholarly approach might object. Despite the absence of a systematic bibliography - the author prefers to include his sources in the text, which leads us to say that Sulte must be read "in the original" - historians can be grateful to him for having added an index and pictorial material (photographs, maps and plans) to his work. A check of his sources reveals that most of them

are, in fact, from large collections in federal, provincial, judicial and private archives. However, he seems to have had several original documents concerning the Poulin family in his possession. Although the author occasionally questions documents like the *Mémoires* of Laterrière in several respects, the accuracy of the information he provides about certain events is now contested: for example, the date of the death of Poulin de Francheville and the material on the first iron plates produced at the ironworks. Also to be accepted with some reservations are the population data and several details regarding the technology and buildings.

Sulte's political thoughts place him among the liberal historians of the end of the 19th century, and his views of the French colonial system and the Conquest are similar to those of Francis Parkman. The theory that progress is natural and inevitable is the basis of Parkman's interpretation of the past, especially in his writings on the history of New France. His thesis is therefore built on a conflict between the enlightened spirit of a progressive Protestant Anglo-Saxon nation and the obscurantist spirit of French Roman Catholic absolutism. However, in Parkman's eyes, several important figures like Frontenac personify the idea of progress under the Ancien Régime. Sulte feels the same way about Beauharnois and Hocquart, "those men of 1840" living in 1740. Similarly he does not see the war of 1760 as a conquest but rather as a liberation from the stranglehold of an absolute monarchy.

Benjamin Sulte's study on Les Forges du Saint-Maurice forms, for all practical purposes, an infrastructure for later works of the same type. To contemporary historiography he contributes a methodology based on the research, analysis and interpretation of written and oral sources, and an approach which embraces many subjects - science and technology, architecture, economics, demography, material culture and everyday life. He ushers in the multidisciplinary orientation that typifies the work of modern historians.

First published in installments in les *Cahiers de Dix* between 1945 and 1950³ and summarized in 1945 in les *Cahiers Reflets*,⁴ Albert Tessier's monograph, *Les Forges Saint-Maurice*⁵ is an attempt to bring together the main events which marked the development of the ironworks from its establishment in 1729 to its closing in 1883. The author informs the reader that the Saint-Maurice undertaking was not the first of its type on the North American continent, pointing out the prior establishment of ironworks in Virginia, Massachusetts and New Jersey in the 17th century. Describing America's attraction for Europeans of the Renaissance period, he tells how the quest for metals began with the first voyages of discovery, although instead of precious stones the adventurers had to be content with more ordinary minerals. The first section of Tessier's study is therefore a brief history of this search for ore in New France.

The accounts of the voyages of Cartier and Champlain contain references to the earliest discovery of iron ore deposits - in Acadia in 1604. However, Pierre Boucher's 1663 inventory does not include iron ore in the Trois-Rivières region. After the administrative reorganization of the colony in 1663 prospecting became more systematic. Drawing on information contained in official correspondence and papers, the author reports the efforts sponsored by Jean Talon to discover iron, copper or coal, the mining methods recommended and the frequent sending



General view of the industrial village of Les Forges du Saint-Maurice about 1845. (Wash tint, painter unknown, collection Parks Canada.)

of samples back to France. He notes the slightly interested replies from the Court and the lack of further action following the dispatching of the master ironworker La Potardière in 1670 and laments the fact that Talon returned to France without having succeeded in setting up a great metallurgical industry in New France.

Also related in the work are the plans that Frontenac made after he examined the iron ore deposits at Trois-Rivières and his recommendations to the Court, which illustrate his social and economic beliefs. Tessier attributes Colbert's gradual loss of interest to French domestic problems and deplores the suspension of Talon's and Frontenac's work under the administration of Denonville and DeMeulle. He also describes the 1687 trip of the master ironworker Séverin Hameau and the unfruitful efforts of the colonial authorities (the Governor of Trois-Rivières, Antoine-Denis Raudot) at the end of the 17th and beginning of the 18th centuries. He concludes that the mother country undoubtedly hoped that a Canadian would take the initiative and start up such an industry.

After giving a picture of Canada's economic situation in 1700, the author reasons that the colony needed an ironworks and examines the requirements involved: capital, machinery, manpower and so on. Then he

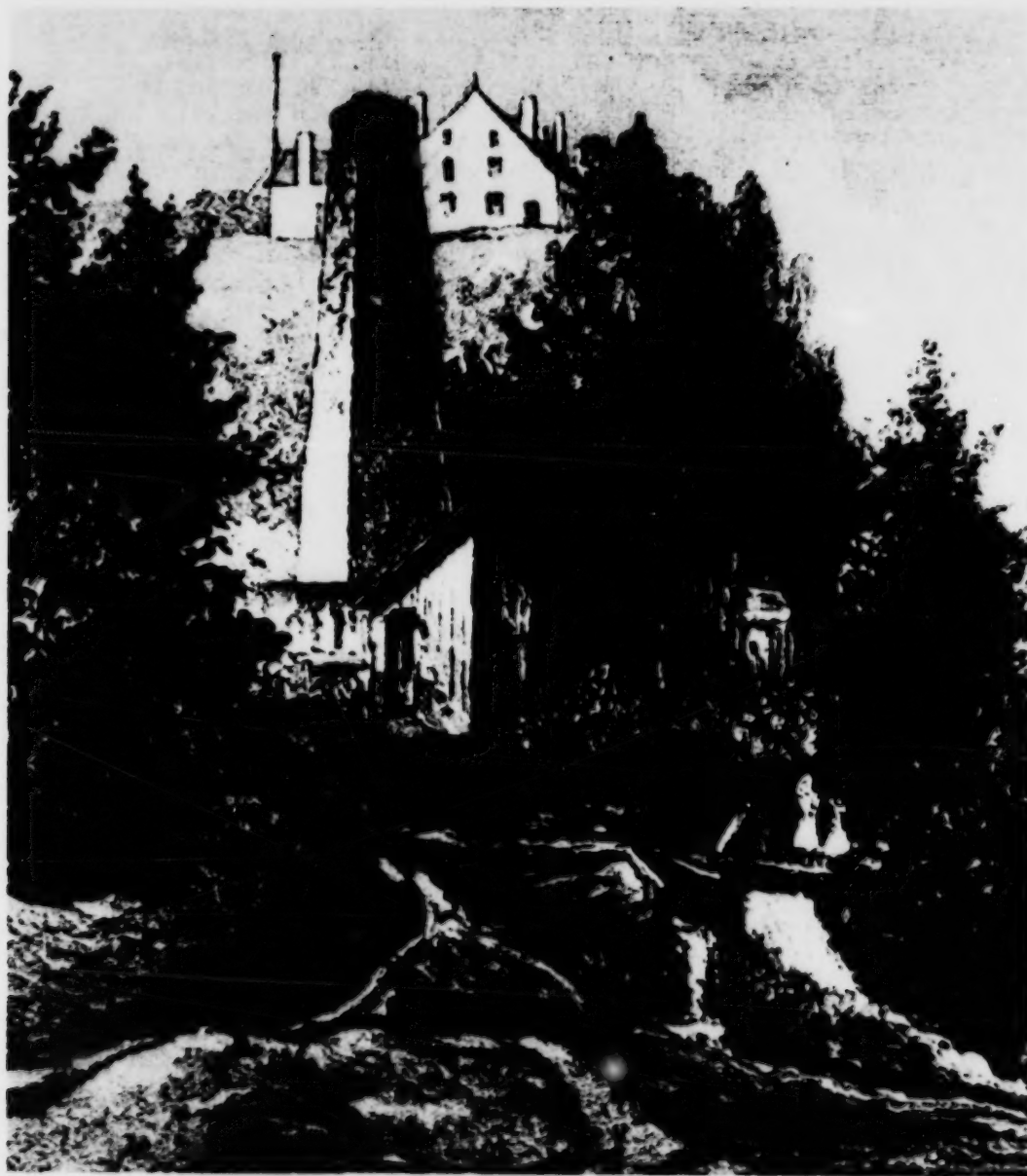
devotes two sections to the establishment of the ironworks and its development during the French regime. Tessier explains how the request of Poulin de Francheville, which was supported by Beauharnois and Hocquart, led to the start of construction in 1732.

At this point the author mentions, without referring to them by name, the elementary methods brought back by the worker Labrèche, who had been sent to New England. Tessier reports the sudden halt in operations following the death of Poulin de Francheville in November of 1733, and the demands for competent ironworkers, which led to the dispatching of a master ironworker from Champagne, Olivier de Vézin, in 1735. An account of the latter's study to determine the site of the new undertaking is contained in the monograph. In the course of the next few years, from 1736 to 1739, a second ironmaster, Jacques Simonet, and several workers arrived to join the existing team. The valley took on the appearance of a large construction site: roads, walls, foundations and a luxurious combined residence and storehouse (*résidence - magasin*) were constructed and locations for the ironworks buildings and furnaces were surveyed.

The author describes the problems in firing the blast furnace, the mistakes made by Vézin in evaluating the waterpower and the corrections made following the investigation by Gaspard Chaussegros de Léry. Operations officially began with the successful firing of the furnace in 1738. Tessier then presents an overview of the industry, drawing largely on the inventory made by Estèbe in 1741, which is supported by original illustrations and plans. This is the only integral description of the whole ironworks contained in this monograph. Then follow several lines taken from the report of Hertel de Rouville, in which there is nothing new. There is no description of the ironworks on a similar scale for the period following the Conquest. In addition to placing the ironworks in its industrial context, Tessier retraces the social and economic developments associated with the industry. For the period of French rule these include, in the area of administration, the formation of the companies of Francheville and Cugnet, the origins of each of the shareholders and their roles in the ironworks' management, the use of royal funds and the gradual failure of the businesses. Using balance sheets, correspondence and official reports, he carefully analyses the causes and repercussions of Cugnet's bankruptcy, as well as the events in the final years of royal administration, from 1743 to 1760.

Turning to the events following the Conquest, the author refers to statements by George III and Governor Haldimand's papers and affirms that "les Anglais prennent les Forges au sérieux." He describes how activities continued under the earnest management of the Governor of Trois-Rivières, Ralph Burton, during the military rule from 1760 to 1764. He adds that since this government showed itself to be in favour of private enterprise, the industry returned to the private sector in 1767. Using newspapers of the era, letters and reports, Tessier gives a fairly precise outline of the period under the leaseholders (Christopher Pélissier, Pierre de Sales Laterrière, Alexandre Dumas, Conrad Gugy, Alexander Davidson, John Lees, David Munro and Matthew Bell), the duties of the shareholders and the numerous transactions and contract terms, which varied from lease to lease.

With the exception of some discreet observations about certain directors - for example, Pélissier and his flirtation with American ideology - there is little material dealing with the operation of the ironworks during this early period. Tessier feels that Laterrière's



The chimney of the lower forge and "la Grande Maison" about 1882.
(Drawing by Lucius O'Brien, published in Picturesque Canada, Toronto,
1882, Vol. 1, p. 96.)

Mémoires probably paint an embellished picture of the ironworks, and he quotes excerpts as examples. He deals at greater length with the 50-year rule of Matthew Bell which began in 1793. Noted are the rivalry between the Saint-Maurice ironworks and the Batiscan ironworks, the latter's wish to appropriate the former, Bell's opposition and the repeated negotiations every time his lease came up for renewal, until 1845. Then Tessier very quickly deals with the administrations after 1846, including the action taken by Henry Stuart and John Porter to sell land, their bankruptcy in 1861, and the efforts by the McDougall family to set the business back on its feet. Under the McDougalls' competent management the ironworks prospered for a number of years, but began to go downhill in 1872 owing to an economic crisis which precipitated its closing in 1883.

For Tessier, the earliest Canadian-made iron products date from 1732, when small items like horseshoe nails were first manufactured in the colony. However, he does not specify whether these objects came from the Saint-Maurice ironworks. After supplying some production figures - considered fairly low - for the period when the industry was managed by the first financial companies, he reports the substantial profits made during the years of royal administration, which continued to grow steadily after the British took charge. Various statistics for the years 1761-68 are given (although some of these cannot be considered reliable) as well as figures for the year 1833, taken from an inventory made by Matthew Bell.

Tessier draws up a fairly systematic list of the main products made at Les Forges beginning in 1738. At first these were limited strictly to iron bars but they gradually expanded to include tools, household objects and artillery parts. However, he points out that some of these items were considered to be of poor quality in 1746. To the energetic efforts of the first British directors he credits the designing of new stove models during the year 1763. Using as a source the *Journal de l'invasion du Canada* written by the notary Badeaux, he discusses the traffic in iron bars and artillery parts between Pélissier and the Americans. Tessier gives the worker a prominent place in his monograph, frequently mentioning the hiring of workers under the French regime, their places of origin and their trades. Several reports and ordinances provide information on wages and working conditions. He emphasizes the fact that the ironworks industrial community constituted a special environment, and recounts in several places the insubordination and lack of discipline of its members. He also notes a shortage of specialized labour, which apparently disappeared under the British administration when workers were recruited from different ethnic groups.

Political developments connected with Les Forges du Saint-Maurice are one of the major subjects of the monograph. After describing the requests sent to the French Court by colonial authorities and its evasive replies, Tessier admiringly recounts how Poulin de Francheville, on his own, boldly invested his modest fortune in an industrial venture without any real knowledge of what the requirements or results would be. A lack of funds, however, was to force him in the end to associate with others. These are the steps Tessier examines one by one: the chargeover from a private undertaking to a management company, the gradual and unconditional involvement of colonial administrators, and finally government takeover after the companies' bankruptcies. The documents quoted reveal a home country which was extremely paternalistic and

obviously unconcerned, despite its mercantilist ideas. It would be interesting to note the number of times Beauharnois and Hocquart were hauled over the coals by Maurepas . . . and then in turn gave the same treatment to their subordinates. Tessier almost succeeds in convincing his readers that the ironworks was not doing well under the French regime.

Despite the sad state of the enterprise at the time of the Conquest, it attracted the attention of the British, who speeded up its recovery. The author refers to the negotiations between France and England that took place after the Seven Year's War to decide on the redistribution of colonial possessions and explains why Canada was considered more valuable than Guadeloupe.

The most memorable details for the period of the leaseholders are Tessier's spicy comments on the "long règne" of Matthew Bell from 1793 to 1845. Tessier seems to have turned to the records of the Legislative Assembly of Lower Canada and Executive Council papers to find evidence of all the controversies raging during these years. After listing the exceptional abilities of this Scotsman, he attempts to link with his membership on the Legislative Council the successful negotiations which allowed him to remain in control of the ironworks for over half a century and the development of a monopoly on land in the Trois-Rivières district. This grand seigneur had an extravagant and expensive life style which guaranteed him prestige in the eyes of important people and powerful protection. The people of the area and their representatives became hostile and frustrated at not being able to settle where they pleased in the Saint-Maurice Valley. Tessier gives a faithful account of the grievances and protests against the yoke of Bell's metallurgical empire, considering them in the context of a surge of "national" outrage underlying the political crisis which shook Lower Canada in 1830. Finally, he comments on the victory of the "anti-Trustards" which resulted from the investigation of the Executive Council in 1845. Like Sulte, he undoubtedly sees the strong political feelings behind these debates, but goes further and discovers in them the rising up of a people which feels deprived of its rights.

This recurring idea provides a key motive for his writing. Aware that the progress of a country is measured in economic terms, Tessier feels that the historic importance of economic factors has been eclipsed by more colourful events such as the heroic deeds of political and military figures. The great shortcoming of "popular" history - used here in the traditional sense - is that it overemphasizes outstanding and glamorous acts and neglects everyday life. Tessier therefore proposes to reestablish the balance by recording the most humble and inconspicuous actions of those who took part in the development of Canadian resources in the 18th century, and seeks in particular to relate the efforts, successes and mistakes of the brave men who established in the Mauricie region one of the first industries in North America.

The author's approach is to follow and elaborate on a carefully structured outline of events. His plan is so strictly organized that one wonders why a separate chapter is not devoted to the period of Matthew Bell's management, given the importance he attributes to him. Tessier's monograph could not really be described as empirical. The use of primary and secondary sources (carefully documented within the body of the text and in appendices) and photographs of original maps and

plans gives it a scientific character.

Although Tessier may have nothing original to pass on to professional historians, they will certainly be grateful to him for having organized the documentation available to him in a systematic, coherent and readable way, for having written and arranged his chapters in a clear and simple manner and for having alerted them to original documents relating to the 1760-64 period - in short, for having made a key contribution to the study of Les Forges du Saint-Maurice.

Considering the very personal judgments made on the events described, Tessier's work may easily be included among current trends in contemporary Quebec historiography. In his summary of the situation at Les Forges at the end of the French regime, he writes that although much energy and money had been spent on exploiting the areas's resources, complete success was not achieved because of the lack of clear direction and purpose, inadequate measures and the shortage of qualified labour. He adds that "l'histoire française des Forges, plus encore que celle du Canada, se termine sans splendeur pour la mère patrie." Does one not detect behind these words the essence of the nationalist ideas earlier expressed by Canon Groulx?

However, Tessier denies that he is a historian and expresses his intention to remain a humble popularizer of the past for the general public. He gives the following simple definition of his conception of history:

C'est la masse anonyme qui, en définitive, bâtit un peuple, humanise une terre, dompte et discipline les forces que la Nature offre, ou oppose, aux initiatives. L'Histoire est faite surtout d'actions communes, répétées généreusement à des millions d'exemplaires ...⁶

It is difficult to determine how to classify a historian such as this who attempts to make his countrymen aware of their heritage by presenting a social and economic study touching on such topical and interesting subjects as the establishment of an industry, the interplay of production forces (capital, labour, markets and wages) and the industry's impact on the life and outlook of the workers.

Retrospective Works

There exist approximately 20 articles written between 1880 and 1920 and, more recently, between 1955 and 1965, which present a retrospective view of Les Forges du Saint-Maurice. These works generally begin by reporting the series of mineral explorations and discoveries in New France, sometimes recording the location, quantity and quality of natural resources, and the repeated requests from colonial authorities to the mother country for the means to develop these resources. Then the authors deal with the result of these applications - the granting of a concession to Poulin de Francheville - and the industry's early years under the French regime. They describe the formation of the various companies, their financial backing, their operating difficulties and their eventual bankruptcies.

Some of these works do not go beyond this period and those that do include very few details of the military regime. However, the thread of



Tapping of the blast furnace, inside the casting shed. (Drawing by Lucius O'Brien, published in Picturesque Canada, Toronto, 1882, Vol. 1.)

the story is taken up again with abundant information on the administrations of the leaseholders, including their transactions, the schemes of Christophe Pélissier and the social activities during Matthew Bell's time. There is little elaboration on the subsequent owners except to mention their disappointments, and the closing of the ironworks is generally attributed to the exhaustion of raw materials. Some articles touch on the technology and facilities of the ironworks, while others sum up economic conditions in terms of output, finished products, the work and the labour force.

Within this general pattern it is possible to distinguish different treatments of the events. Several articles do not go beyond the stage of a rough chronological outline (the articles by J.-E. Bellemare,⁷ Père Lejeune,⁸ James Swank,⁹ Pierre-Georges Roy¹⁰ and Valois de Valoisville¹¹), covering only the period of the French regime. Some of the facts must be accepted with reservations.

There are differing opinions concerning the first iron ore found in New France. Most of the authors give 1667 as the year of its discovery in the Trois-Rivières area. While there is some confusion in the articles by James H. Bartlett¹² and B.F. Townsley¹³ surrounding the explorations of the master ironworkers, the writings of La Tesserie and La Potardière, W.J.A. Donald¹⁴ and Geo. H. Macaulay¹⁵ contribute new information by stating that the Saint-Maurice iron ore deposits were probably known to the Indians before that date. Some authors approach the development of the undertaking from a technological point of view: James H. Bartlett¹⁶ and Desmond Killikelly¹⁷ record the probable date of the construction of a first forge as 1730, while Hervé Biron¹⁸ mentions some fairly original details concerning the ironworks equipment and buildings. He explains that the bases, operations and practices of the industry were firmly established from the beginning and remained the same until the works closed down.

This author also adds information about production figures, the chief products (sometimes explaining the method of manufacture), the work force, the working conditions and the numbers of workers. These data are complemented by a very short article by Michel Gaumond¹⁹ which mainly describes the structures of buildings such as the church and the master's house. However, the descriptions of the establishment in the 19th century written by Michel Bibaud,²⁰ George M. Grant²¹ and Sidney L. Irving²² cannot be taken too seriously. Consciously or not, these authors paint a sometimes vague, sometimes inaccurate or romantic picture closer to fantasy than fact. Similarly, the few pages devoted to Les Forges by Yvon Thériault²³ and those found in a paper by the Chamber of Commerce of Trois-Rivières²⁴ could not be described as particularly original. These studies, which report the main facts in the development of the industry from economic, political, social, structural and technological points of view, are only warmed-over summaries of ideas expressed earlier by Albert Tessier.

At the time when the ironworks was still in full operation, and for a few years after its closing, Les Forges interested certain English-language authors. Like Benjamin Sulte, Geo. H. Macaulay²⁵ and Fred C. Wurtele²⁶ recount the history of Les Forges chiefly from a political point of view, using original documents. They feel that the only valid sources as far as the French regime is concerned are several letters sent by Frontenac and Denonville to the "gouvernement impérial" between 1672 and 1686, and the account of the voyage of Louis Franquet

in 1752. While Macaulay does not mention any special efforts by British authorities prior to 1767 to put the enterprise back on its feet after the Conquest, Wurtele proves the contrary with the help of the Haldimand papers. Both of these writers amply describe the administrative changes that took place at the end of the 18th and beginning of the 19th centuries - using the *Mémoires* of Pierre de Sales Laterrière as their principal source - and emphasize the period under Matthew Bell.

These studies, which have certain similarities as far as documentation, interpretation of events and inaccuracies are concerned, deserve our consideration because their authors are pioneers in writing this type of work. Their manner of giving a factual account was to inspire, in the years immediately following, authors like James H. Bartlett,²⁷ Abbé Napoléon Caron²⁸ and William J. Donald²⁹ and, in the post-war years, an anonymous contribution to the magazine *Iron and Steel of Canada*.³⁰

An article published by R.C. Rowe in 1934³¹ is of interest not so much because he presents, like the above-mentioned authors, a panorama of Les Forges, but rather because he offers a very personal view of the ironworks' operations. The author describes the type of ore available and explains to what degree the different steps involved in the recuperation and transformation into finished product were the same as modern industrial procedures.

According to this author, Les Forges would have had a significant impact on the political and economic development of Canada. Having shown the importance of the production of functional objects during the French Régime, he points out the vital role that Les Forges represented in the course of negotiations between England and France after the Conquest. If England chose Canada over Guadeloupe, its mineral wealth was undoubtedly one of the reasons. Afterwards, enlightened administrators such as Burton and Haldimand succeeded in bringing the ironworks back to normal operation and in restoring to it the dynamism it had known in the 19th century.

The history of Les Forges inspires the same author with nostalgic thoughts on the Canadian iron industry in the early 1930s. The iron production was facing a definite backslide in Canada, and the international economic climate did not permit one to hope that this industry would again enjoy the intense activity Les Forges used to know.

Rowe's reflections may therefore represent a transition between a traditional view of the history of Les Forges du Saint-Maurice and the trends of modern historiography, which attempts to examine this subject from very specialized angles. His conception of history is one indication:

As a general rule history concerns itself mostly about affairs of government and conquest, and rarely about the more prosaic matters of industry. This is probably as it should be, but, on the other hand, industrial history contains many a fascinating story that is worth the telling...

These words give us a glimpse of the ideas which were later to be developed by Tessier and his associates.

The monographs of Benjamin Sulte and Albert Tessier and the panoramas painted by their predecessors and disciples tie together the thread of the factual narrative. All of them relate, in styles ranging

from elaborate to succinct, an episode spanning more than 150 years of Canadian history - a significant length of time for a country barely three and a half centuries old. Some unkind critics might call these narratives stories - material suitable for a television series. All follow a pattern, with only slight variations, to which similar interpretations are easily fitted. This resemblance is undoubtedly linked with the availability of documentation, which is abundant for the French Régime but gradually thins out and becomes incredibly scarce for the period following the Conquest. Herein lies the whole contradiction of the historiography of Les Forges du Saint-Maurice: its "âge d'or" in the 19th century is characterized by an astonishing lack of relevant sources. However, the body of existing writings offers a double advantage: it contains information which is at the same time valuable and questionable. These two characteristics prove complementary in stimulating historical research; it is impossible, for all practical purposes, to depend entirely on any one of these writings because they incorporate a comfortable number of inaccuracies. Nevertheless, the approach taken in most of them - an empirical one, especially in the organization of documentation - must serve as a model to the historian who will be prompted to return to primary sources and put together an original account. From this dialectic will spring a series of facts grouped thematically according to an appropriate methodology. The linear observation that characterizes detailed narrative history will give way to the modular analysis accompanying specialization.

INDUSTRIAL STRUCTURES

Under French Rule

Although there are a considerable number of very general historical studies touching on Les Forges du Saint-Maurice, the specialized studies on this ironworks can be counted on the fingers of both hands. We will examine seven of them, published between 1927 and 1975, which describe the industry itself from economic, political, social, structural and technological points of view. Five deal more specifically with the period of French rule, while two consider mainly the English period. They have been classified by orientation, and it is clear that the economic approach predominates, in particular in the recent works of Cameron Nish and H.C. Pentland and in an earlier study by Joseph-Noël Fauteux.

In his *Essai sur l'Industrie au Canada sous le Régime français*, published in 1927,¹ Fauteux, a professor at the Ecole des Sciences Sociales of the University of Montreal, devotes one chapter to Les Forges du Saint-Maurice. At the beginning of the chapter he remarks that he found Benjamin Sulte's book very useful, and he presumably also made abundant use of published and unpublished material from various Canadian and Quebec archives.

The reader is immediately plunged into the industrial life of the early 18th century, with the petition by Poulin de Francheville and the concession granted by the royal authorities. The author mentions the study trip to New England by the workman Labrèche, and the result: the construction of the first forge in 1732. After describing its operation, he notes the defects and shortcomings - for instance, in the construction and the smelting techniques - and suggests that these factors contributed to poor production levels.

Further action was taken when the ironmaster, Olivier de Vézin, was engaged in 1735. He carried out a study which was a determining factor in the choice of Les Forges site in 1736. Arrangements were made for the construction of technical facilities, and in 1737 rather optimistic plans were drawn up by Hocquart, the Intendant, who hoped to make the new ironworks a model industry. The author also discusses the problems experienced in trying to fire the blast furnace, which forestalled any activity until successful firing in 1738. He mentions Vézin's mistakes in his use of water for motive power and remarks on the construction of the first industrial and residential buildings in 1739.

There were economic considerations connected with the establishment of the industrial complex. Fauteux presents interesting statistics on equipment costs and production figures - for example, for the Francheville forge - for the years 1737 to 1748 and 1750, emphasizing the profits and losses. He analyses product quantity and quality and price control, and relates production to the needs of the colony and of

the mother country. He completes this survey with some very pertinent remarks on manpower: the process used in recruiting workers in France and the repercussions of this recruitment, the training of some of these men in New England and the manner in which wages were distributed. Although he occasionally notes the importance of certain trades, as a general rule he points to the unavailability of skilled workers, incompetence and lack of discipline as factors contributing to the inefficiency of Les Forges during this period.

The managers no doubt also contributed to this low productivity. Fautaux draws a detailed picture of the activities of both companies, discussing their organization, the duties and privileges of shareholders, the distribution of royal subsidies, the firms' debts and their ultimate failure. He relates Cugnet's financial difficulties to this situation and tries to distinguish Cugnet's own involvement and the part played by the colonial authorities. He points to the stagnation that followed the death of Poulin de Francheville, and several times criticizes the way some members like Cugnet and Vézin were led to indulge in extravagance through their love of luxury and power. At the same time he presents a fairly precise picture of the role of the home country, quoting the numerous warnings sent to the administrators. On the basis of Franquet's account, he believes there were abuses while the ironworks was under the control of the Crown and suggests that the home authorities would probably have liked to see the business in the hands of private individuals, who would doubtless have made it a complete success.

We are indebted to Joseph-Noël Fauteux for a scholarly presentation of the principal milestones in the history of the emerging industry of Les Forges du Saint-Maurice. Based on full, well-organized documentation, despite its factual approach his work does more than merely give the sequence of events. By analysing their full significance, the author goes beyond the simple events and adds a political, social and economic dimension to the studies published to that date. In this he was to set a precedent. In laying the foundation for an industrial history, he was to find followers who would either produce watered-down versions of his theory, as was the case with Gérard Filteau,² or, like Cameron Nish and Marcel Trudel, give it a new orientation.

From 1965 to 1967, Cameron Nish presented readers interested in the economic history of Canada with a series of original documents, principally related to the financial activities of Sieur François-Etienne Cugnet.³ In 1975 he took this mass of information and reorganized it to produce an impressive work on Cugnet's business undertakings in New France.⁴

The work takes the form of a study of entrepreneurship: in line with current Business History trends and theories like those of Cole and Evans, Nish discusses the activities of his subject in 18th-century colonial business circles. The first part retraces Cugnet's family history and his early public career as administrator and adviser. The following four chapters discuss his role in Les Forges du Saint-Maurice companies, in which he was a shareholder. Finally, the account touches on his other business activities in connection with the Tadoussac farm, and his estate.

Nish keeps to established practice in his handling of the factual history of Les Forges: he discusses the mineral explorations of the

17th century, the petition by Poulin de Francheville and the difficult beginnings of the industry, the formation of the companies and their failure and, lastly, the period of Crown administration. The originality of his work lies in his interpretation rather than in the discovery of new facts.

The author provides us with technical details on the construction and dimensions of the various buildings: the first forges and the workers' quarters in 1733. He provides a summary of the equipment and the installation costs as established by Vézin's investigation of 1735, reports on the defects of this equipment as well as shortcomings of the hydraulic power system and evaluates the entire works as it was in 1740. It is interesting to learn that the Francheville forge was akin to the bloomeries⁵ then in use in New England. If this is in fact the case, what was the "bâtiment des forges" used for in 1733, and by what process was pig iron obtained that same year?

Nish seems to be more interested in the economic and administrative aspects. After analysing the mercantile conditions which allowed the mother country to grant Poulin de Francheville's petition, he describes the formation of Les Forges companies. He distinguishes between the companies on the basis of the privileges granted: the Francheville company was a type of "société générale," whereas Cugnet's company was completely subsidized by the state and differed in the rights and obligations of the shareholders.

He discusses at length the operations of Cugnet et Cie, its reorganization and the tense situation which prevailed among the members after 1739. He presents data, based on a report by Cugnet, on the partners' accounts and on the receipts and expenditures of the company between 1735 and 1739. These data lead to a detailed explanation of the administrator's bankruptcy in 1741-42. Several tables showing the amount claimed by his creditors and his own claims and the analysis of his financial assets in 1742 are particularly interesting. Nish also enunciates the influence of Intendant Hocquart in the numerous lawsuits which took place later.

The financial history of Les Forges parallels that of the administrator. It is sketched out in a series of tables showing total production between 1739 and 1741, output and sales of iron from 1741 to 1743 and the types and amounts used in shipbuilding. These tables - obviously considered self-evident as they are discussed only briefly - are supplemented by some interesting notes on weekly production in terms of working days, local and international markets and total output between 1738 and 1743.

Nish goes on to comment on the industry's labour force: the recruiting methods, the lack of skilled labour, the study trips outside the country and the insubordination. To support his analysis, he uses data on the workers' wages according to trade or task and the sums paid out to them in 1741-42. Most worked only part-time, and the author states that they were "locals" from the Trois-Rivières region. We might ask, tongue in cheek, whether the directors did not also sign on braves from the Têtes-de-Boule or Wabanaki tribes.

A chapter on Cugnet's personal life is worth reading. We are indebted to Nish for his inventory of the entrepreneur's house and library. The library reveals an exceptionally well cultivated man, but it is surprising that we should find so few works on the pure and applied sciences. How can we explain the almost total absence of books



"La Grande Maison" shortly after its abandonment ca. 1895. (Watercolour by H.C. Stuart, Collection Allan McDougall.)

on technology or metallurgy in the library of an ironworks administrator at a time when the industrial revolution was imminent? As far as his residence is concerned, a laudable effort has been made to establish the configuration and describe the furnishings. However, from the structural viewpoint, the author might fruitfully have compared it with the residence of an 18th-century merchant - Guillaume Estèbe - which was located nearby.⁶

We can raise some questions as to Nish's presentation - for example, the organization of the book. It is not clear why the introduction and the first chapter are amalgamated when there are points dealt with in the conclusion which should have been raised in a separate introduction. Similarly, the titles given chapters III and IV do not accurately reflect their contents. How can he talk about the first Forges companies from 1541 to 1735 and about Cugnet et Cie from 1735 to 1737, when from 1541 to 1730 they were in fact no more than projects in

the planning stage,⁷ since the Francheville and Cugnet companies were legally formed in 1733 and 1737? However, the fairly detailed bibliography and the numerous maps and illustrations all make a good impression, although the original photographs of Les Forges site in 1970 do not really illustrate the details intended. Moreover, we probably owe him a great debt for his efforts and patience in organizing the Series C11A documents so as to make them more accessible and more suitable for use in a study in economic history.

Nish's book is innovative in this sense. The theory of entrepreneurship applied to Cugnet can be maintained if it is supported by solid, realistic data, for instance on his debts and income and on the accounts of the company he co-administered. If his bankruptcy was the result of a normal process in the evolution of an underdeveloped society and did not necessarily correspond to the fortunes of Les Forges du Saint-Maurice, would Cugnet be typical of the bourgeoisie left floundering even before the Conquest by the shortcomings of the French colonial system? A great deal of emphasis has been placed on his importance as an administrator of Les Forges because of his personal wealth and, as a result, the many lawsuits brought against him. But what about his partners? They certainly do not appear to have lived in poverty, which implies that they could have been involved in a lawsuit. Consequently, the entrepreneurship theory can be applied to them as well, just as it can be applied to any individual, including native people, active in business in New France.

Nish's merit lies in looking at the problems of colonial entrepreneurs from the point of view of economic history; H.C. Pentland,⁸ on the other hand, is responsible for bringing to light the situation of the workers by a systematic look at labour relations. In an article published in 1959, this author analyses the development of a capitalistic labour market in Canada. After defining these terms and relating them to an overall economy, he goes on to recognize a fairly strong interdependence between demand and working conditions and infers that, historically, the fundamental form of the labour market is closely tied to the evolution of these factors. Demand in this system is clearly different from demand under other forms of labour organization, and the author here makes a distinction between slavery and feudalism. He adds that a capitalistic society does not necessarily give rise to the development of a capitalistic labour market, and states that although the early European population of Canada was part of the capitalist world, actual conditions were most often feudal in form.

Slavery certainly existed in this country but it was never widely practised because of the high costs involved, as well as its basic unprofitability and unsuitability for the conditions at the time. Until about 1850, feudalism was most common. The seigneurie system was the most striking example: a nobility stripped of privileges maintained a direct relationship with its dependants - in this case habitants who were free to live on their own land and spend their own money - and this attitude was to delay the emergence of a capitalistic agricultural system.

The early development of the colony was subject to problems similar to those experienced in medieval Europe, that is, the lack of markets and skilled labour. Pentland explains how the lack of capital conditioned the type of relations which existed between employers and employees, at the outset as well as over the long term.

Les Forges du Saint-Maurice thus makes the best example of a feudal labour system. In this village, isolated from the rest of the colony, a permanent community was established. It lasted because it was structured and hierarchical, and because of the background of the working men, their attitudes, the number of intermarriages and the custom of passing on trades from father to son. He comments on the extreme dependence of skilled workers on the company for housing and services, the gradual drop in wages and the pernicious monopolies of some of the directors, including Matthew Bell, whose time as administrator of Les Forges coincided with the technical and political decline of the ironworks. He concludes that the impetus provided by those at the operational levels brought Les Forges to the threshold of the 20th century, despite weaknesses at the managerial level.

Pentland's theory regarding the social infrastructure of a specific industrial community and its relationship with the international economic situation is worthy of attention because it suggests a new aspect of economic and social history - the study of a population group, its origins, its alliances, its attitudes and its working environment.

The physical characteristics of Les Forges du Saint-Maurice complex have aroused the interest of several researchers. A report by David Lee published in 1965⁹ presents a brief history of Les Forges in its introduction, covering the usual topics: the discovery and identification of the ore, the formation and failure of the companies in the 18th century and the successive administrations in the 19th century. He comments in particular on the economic, structural and technological aspects. He mentions the great variety of products and ties their manufacture to the international context. He also furnishes some statistics on annual production, for example, for the year 1808. However, in his discussion of the equipment and facilities, he uses a new approach. One chapter is devoted to a study of such structures as the blast furnace, the upper forge and the lower forge, based on archaeological data, as well as of other buildings like the master's house and the bakery. The information is complemented by pertinent documentation: for instance, one of the appendices reproduces in full the inventory by Estèbe in 1741. The novel approach and methodology used in Lee's report, which is essentially an archaeological study, make it a useful work for those interested in this field or in technological structuralism or history.

A chapter in Maurice Filion's *La pensée et l'action coloniales de Maurepas vis-à-vis du Canada*¹⁰ provides a look at the mother country's attitude and actions with regard to the creation of a metallurgical industry in New France. Filion gives several reasons why no attempt was made to mine the ore early in colonial times and states that Maurepas, as Minister of the Marine, broke new ground in supporting resource development. In keeping with his mercantilist views, Maurepas decided to open iron mines and construct forges to build the ships he wanted.

The statesman's almost unlimited support first for Poulin de Francheville's private company - because it was a private company - and later for the numerous petitions by Beauharnois and Hocquart, whose views matched his own, is considered by the author in terms of overall economic development policy. Throughout the rocky history of Les Forges, the Minister was to send numerous communications granting or refusing royal subsidies or skilled workers, criticizing the poor

quality of the items produced, regulating the price of iron or supporting the erection of new structures, following, of course, "plusieurs examens de la situation."

Filion seeks to show that although Maurepas's ideas differed from those of the Conseil de la Marine and sometimes of the Trésor royal, he did succeed in setting up an iron industry in Canada. He limited himself to Les Forges du Saint-Maurice even though other similar projects were proposed, in order to avoid any competition which might have brought concomitant financial or administrative problems.

This short piece on Les Forges does provide an original touch in that it reveals the attitude of the home country. But it goes no further. Those who have not looked at Fauteux or Tessier would find Filion useful, but those already familiar with their work would find that Filion presents the same technical points and remarks on company organization, the same figures for production and deficits, and the same comments on the lack of manpower, Cugnet's financial difficulties and the company's general situation at the end of the French period. The points he raises are worthwhile, but he seems to be overly bound by the restrictions of the traditional political approach.

Under British Rule

In his monograph, Albert Tessier provided some new information concerning the directors of Les Forges immediately after the Conquest. This research was pursued further by Marcel Trudel, who presents an account of their administration between 1760 and 1764 in his study, *Le Régime militaire dans le gouvernement des Trois-Rivières*.¹²

He first takes a general look at the Forges - the area, the environment, the population and the various industrial and other buildings - and states that these elements formed an organized village. However, the aftermath of the Seven Years' War led to rather unfavourable economic conditions: the new government ran a financial deficit after activity in some important sectors, such as the fur trade and shipbuilding, fell off.

In this context, the author explains the various steps taken to get the industry on its feet again: the general inventory by Hertel de Rouville, the orders given to Poulin de Courval to resume work, the hiring of fresh manpower, salaries, the construction of roads for hauling out the charcoal and the notices regarding woodcutting, the manufacture of iron bars and so on, all of which he credits to the Burton administration. His remarks about Haldimand's administration are in the same vein. Trudel talks about the expenses incurred in reorganizing the worn-out facilities and the Governor's plans to make Les Forges a true industrial centre to serve as an outlet for all the old iron from North American forts. After studying iron production and market fluctuations between 1762 and 1764 and discussing the role of civilian and military manpower from the point of view of numbers, competence and mobility, he concludes that the takeover of Les Forges by British administrators during the period of military rule was to the advantage of the ironworks.

On the political level, Trudel, like Tessier, attributes a



Ruins of "la Grande Maison" ca. 1900. (Public Archives Canada, neg. C4662.)

determining influence to Burton's statements before the Board of Trade in 1763 in the choice of Canada by England during the Treaty of Paris negotiations, but he emphasizes the spirit of Article 55. He concludes by analysing the tremendous affect on the population of the institution of civilian government. This study by Marcel Trudel deserves careful consideration, both for the number of original documents made available - including certain censuses and reports - and for the very clear picture it gives of Les Forges village as it was during a hitherto rather obscure period. He shows how the impetus provided during the years of military rule benefited the administrators who followed.

In an effort to situate the iron industry in the 19th-century North American economic context, David J. McDougall sketches out its development in Canada after 1850.¹³ He emphasizes the importance of Les Forges du Saint-Maurice as the only Canadian iron producer under the French Régime, and notes the gradual spread of this type of works across the country. He observes that most of the successful operations at this time were owned by the McDougall family - Scots who had come to this country in 1833. This provides him with the opportunity to take a brief retrospective look at their industrial undertakings in the immediate vicinity of Trois-Rivières and explain the reasons for their profitability.

McDougall attributes the success of each of these operations to one essential piece of equipment: the charcoal-fired blast furnace, as developed at Les Forges. He describes the type of ore mined and the raw materials used, and states that until 1880, iron production was by means of this type of furnace. After listing the principal products, he mentions the difficulties encountered by certain works in the early 19th century and the reasons for their closure. He credits John A. Macdonald's National Policy of 1878 for the renewed vigour of the iron industry in the late 1800s and describes the effects of these measures on fluctuations in the output and price of iron between 1878 and 1912. In this, McDougall's article would seem indispensable to any student of the economic and technological development of Les Forges during the last years of its existence.

Here and there, particularly in parish histories, we find notes on the development of the industrial community of Les Forges. Marcel Pratte draws mostly from the writings of Thomas Boucher and Albert Tessier for his notes on the fief of Saint-Etienne.¹⁴ Hormisdas Magnan retraces the religious history of a neighbouring parish, Saint-Michel-Archange, formed in 1820.¹⁵ The cancellation of Matthew Bell's land monopoly in the Saint-Maurice and Champlain parishes - with 1817 as a significant date - provides commentators like Prosper Cloutier¹⁶ and E.Z. Massicotte¹⁷ with an opportunity to remark on land grants to colonists. The debate which raged between 1829 and 1845, during negotiations for the renewal of Les Forges lease, with regard to the use of a timber stand in the Cap-de-la-Madeleine seigneurie - apparently part of the Jesuit holdings - is discussed in *The Jesuits' Estates Question 1760-1888*¹⁸ by Roy C. Dalton.

Looking at Les Forges in the broad context of the history of New France, Thomas Boucher¹⁹ and several other authors make brief comments on the raw materials, while others mention the explorations which took place in the Trois-Rivières region and on occasion try to explain most businesses' lack of success during this period.²⁰ Several specialized studies - in particular those of Joseph Obalski²¹ and Harry Miller²² - provide numerous details on the technology of charcoal-firing and the composition and quality of the bog iron ore used in the industry. In this connection, the article by Fathi Habashi in *Chemistry in Canada*²³ is of special interest. This article describes certain industrial complexes and provides a selected bibliography of works dealing with chemistry and metallurgy found in the library of the Séminaire de Québec.

Products of Les Forges are mentioned in several articles and monographs. Those dealing with shipbuilding occasionally mention the items which were manufactured at Les Forges.²⁴ Several commentaries

also deal with domestic products - particularly stoves - and discuss their quality, construction, dimensions, price and use. The works of Arthur Legge,²⁵ Michel Lessard,²⁶ Marcel Mousette,²⁷ and Robert-Lionel Séguin²⁸ fall into this category.

In traditional historiography, Les Forges du Saint-Maurice is first unearthed by generalists. Gradually it takes shape and comes alive as the temporal coordinates of each aspect of its rich history are found. Some specialists penetrate the mysteries surrounding the composition of the raw materials and their transformation or recreate the process of setting up the industrial works and their operation. Still others analyse the interplay of production forces - policies, capital, products, transportation, markets and so on - inherent in any undertaking and discuss the effects on the labour force, skills, wages and working conditions.

With the industry thus reconstructed, new avenues are opened for further exploration in the economic and technological fields. However, it would be unfortunate if we were to overlook, amid these technical and economic structures, the essence, the lifeblood of the community: the human element.

THE HUMAN ELEMENT

Biographies of Leading Figures

There has been no large-scale study devoted specifically to the community of Les Forges du Saint-Maurice. Only through a few sporadic notes gleaned from biographies, demographic lists and comments about the activities of people in certain periods and their thinking as reflected in stories and legends is it possible to find out about the type of population that evolved there.

In its design and organization, the enterprise aimed at bringing together influential persons closely involved in the business and politics of New France. This finding emerges from some 20 biographies, drawn from recent and older biographic dictionaries and from short genealogical articles, which exist on the subject.

It is the main administrators of Les Forges who receive the biographers' attention. In this regard, Cameron Nish is responsible for the lion's share, as he has set down the highlights in the lives of Poulin de Francheville, François-Etienne Cugnet, Ignace Gamelin, Jacques Simonet d'Abergemont and Martel de Belleville.¹ With regard to the first promoter of Les Forges, a few notes recall his family background in connection with the Saint-Maurice seigneurie and his activities in the fur trade from 1722. There are fairly long commentaries on his participation in the establishment of Les Forges enterprise, the formation of the first company and the tragic end to his activities in November 1733 as a result of his death. After making an estimate of his fortune, the author concludes by revealing his entrepreneurial qualities, which were lost to the colony through his premature death.

François-Etienne Cugnet is recognized as a man whose diversity of occupations made him undeniably important in New France. His biography relates, in addition to his socially advantaged background, his education and the benefits he derived from his marriage, his career as administrator of the Domaine d'Occident and the Tadoussac farm and as a member of the Conseil Supérieur. Nish dwells longer on Cugnet's duties within the administration of Les Forges du Saint-Maurice concerning the management of his own company - its formation, its technical and financial problems and its eventual failure. In this respect, he notes that despite the proportionate responsibility of each of the shareholders in the enterprise, Cugnet was the only one to be pursued by creditors. Because of his involvement in many of the various businesses of the colony, Cugnet may be considered to be the "very model of a bourgeois-gentilhomme." In a society that lacked men of initiative and trained personnel, he was able to accede to a position of eminence that would have been out of reach had he remained in France. In this respect, this biography presents a faithful summary of the hypothesis developed by Nish on the entrepreneur Cugnet.

Another trader, Ignace Gamelin, receives a modest biographical mention which discusses not only his Canadian origins but also his membership in the group of Montreal merchants and his association with Poulin de Francheville in the development of Les Forges.

Among these traders figures a master ironworker from Champagne, Jacques Simonet d'Abergemont, who is also associated with the second Forges company. The author tells of the terms on which he was hired, his main duties in the management of the enterprise, his intransigence in his dealings with his partners and the plans he submitted following the 1741 bankruptcy in order to restore the industry. Because he was so highly thought of in the Trois-Rivières area, Simonet could not be held responsible for the escapades of his son, Jean-Baptiste. However, he, too, showed self-seeking tendencies and in that way was typical of the French-born entrepreneurs in the colony.

Nish also recalls the role of certain administrators while Les Forges was a state-run enterprise. Among them is Jean Martel de Belleville who combined a career as a civil servant with that of director of Les Forges between 1742 and 1750. An account of his duties allows the author to digress and relate a little of the operation of the establishment at this time, especially with regard to technology and production.

Other historians have brought to life individuals who were closely connected with the management of the enterprise. Hervé Biron traces the family and seigneurial background of Pierre Poulin,² royal notary at Trois-Rivières, and his affiliation with the first company formed by his brother, Poulin de Francheville, while Donald J. Horton writes about these same facts in the biography of Louis-Frédéric Bricault de Valmur,³ Intendant Hocquart's secretary. Thérèse de Couagne, Poulin de Francheville's widow, is given the attention she deserves, with an account of her active participation in and her obligations to the infant industry of Les Forges, which she inherited on the death of her husband.⁴

The main responsibilities carried out by Thomas-Jacques Taschereau, sieur de Sapaillé, in the colonial administration are recounted by Pierre-Georges Roy and Honorius Provost.⁵ They write of his coming to Canada as secretary to Intendant Dupuy in 1726, his appointment as agent to the treasurers-general of the Marine in 1732 and his experience as a member of the Conseil Supérieur beginning in 1735. Provost is of the opinion that Taschereau, used to administering public funds, had the idea of speculating on his own account, which explains his joining the Cugnet company. Very little mention is made of the operation of Les Forges, the author being more interested in describing his duties as seigneur of Sainte-Marie.

Commenting on the various positions held by Sieur Guillaume Estèbe between 1729 and 1750, including those of packman, member of the Conseil Supérieur and storekeeper in Quebec City, Pierre-Georges Roy calls him the "sède effronté de l'intendant Bigot" and one of the greatest profiteers in the colony. Still, the author recognizes the excellent work done by Estèbe in the management of Les Forges du Saint-Maurice between 1741 and 1744, based on the reports prepared by the administrator. Using as a source the orders by the intendants of New France, Roy also outlines the responsibilities of Hertel de Rouville as subdelegate to Les Forges following his appointment by Hocquart in 1747.



Ruins of the blast furnace ca. 1900. (Collection of le Ministère des Affaires culturelles du Québec.)

Some individuals of note who were only briefly or indirectly connected with Les Forges enterprise receive little credit from their biographers. Nevertheless, Donald J. Horton⁸ makes a point of emphasizing the role played by Jean-Eustache Lanouiller de Boisclerc, who participated in the expeditions in search of iron ore at Pointe-du-Lac in 1740, and Frédérick J. Thorpe⁹ emphasizes the role of the engineer Gaspard-Joseph Chaussegros de Léry, who in 1749 analysed the production potential of the industry. Dale C. Standen¹⁰ relates the exploits of Governor Charles de Beauharnois de la Boische, who sought to make the ironworks part of his mercantilist plans.

There is little biographical information on those who rose to distinction in the period following the Conquest. A few notes have been gleaned from short articles and genealogical studies based for the most part on empirical data. Among them can be included the few lines devoted to Zachary Macaulay by Gérard Malchelosse,¹¹ and to Conrad Guty by A. Latt,¹² E.Z. Massicotte¹³ and W.S. Wallace.¹⁴ Francis-J. Audet and Fabre Surveyer, on the other hand, draw from various archival holdings to prepare a short biographical article on Matthew Bell, David Munro and John Lees.¹⁵ They refer mainly to their activities as businessmen and lessees of Les Forges du Saint-Maurice, closely linked with their activities as parliamentarians and members of the military. Added to this are a few pertinent details concerning their origins, their family connections and their descendants. It might be mentioned that in 1898 Benjamin Sulte¹⁶ prepared an account of the political activities of John Lees, while A.H. Young¹⁷ reports on the main positions held by Andrew Stuart.

As a general rule, no one would deny the usefulness of a dictionary as a research instrument and this is even more true in the case of a biographical dictionary. In view of the growing emphasis on specialization in the science of history, it sometimes becomes necessary to study an individual in a context of historical events. In this regard, the biographies consulted in the recent editions of the *Dictionary of Canadian Biography*¹⁸ seem worthy of mention. Written by a variety of historians relying on scientific data, they attempt to describe with accuracy and conciseness the lives of certain outstanding individuals in a given era, and for the most part do so very successfully. This publication thus serves a dual purpose: not only has light been shed on certain individuals whose stories have lain hidden for centuries under the dust of archival documents, but at the same time a small group of historians have emerged from obscurity, having discovered their talent as biographers. This is no doubt a positive result, but one which leads to unevenness in the quality of the biographical production.

What concerns us even more is that the mating of these two favourable elements leads to nothing more than a sort of "who's who" of Canadian history. There is scarcely a page that does not contain the name of a member of the political, commercial, military or religious elite. Is this social superstructure alone representative of our eventful and glorious past? Questions then arise regarding the criteria for selecting these actors and their impresario. We would very much like to see a parallel work undertaken - a sort of dictionary of the nameless - illustrating the exploits of others who contributed to our history - the men and women employed as apprentices, servants and craftsmen in industrial, commercial and domestic settings.

Portrait of the Society and its Beliefs and Attitudes

It is possible to trace the origins and movements of some of those who settled at or near Les Forges from several demographic surveys. Emile Demaizière¹⁹ briefly lists the emigrants from Burgundy who settled there after 1730, following the recruitment efforts of Vézin and

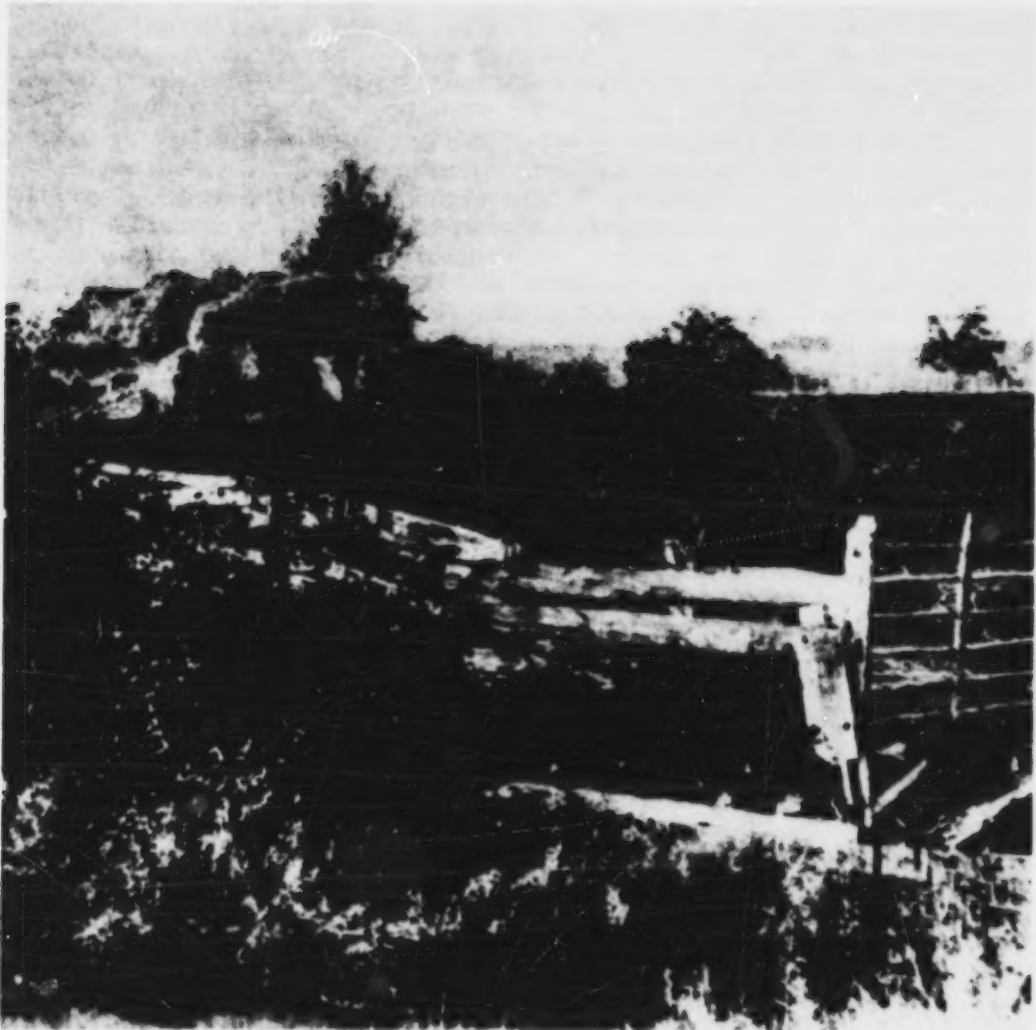
Simonet. Similarly, some workers from France who worked at Les Forges in the 18th century can be traced using data compiled by Gaucher, Delafosse and Debien²⁰ regarding those who signed on to go to Canada.

Although very little is known of the life of the working population, a few scattered indications are provided, notably by Abbé Napoléon Caron.²¹ He reveals all the enthusiasm that characterized activities in Les Forges village between 1748 and 1780, describing the works, the workers, their homes and working conditions and movements of the voyageurs and adding a few notes on the religious life. His remarks are complemented by those of Abbé J.-E. Bellemare²² who made a list of the missionaries and priests who served at the Vieilles Forges between 1740 and 1916. In this respect, the study by Father Jouve, *Les Franciscains et le Canada*,²³ provides information relating specifically to the passage of the Récollets between 1736 and 1769, and their influence in the construction of a chapel and the establishment in 1740 of records of births, deaths and marriages.

This information may imply strong religious tendencies in the population of Les Forges, but they are offset by another reality, that of mythical beliefs and superstitions. A few authors, notably Napoléon Caron,²⁴ Thomas Boucher²⁵ and Dollard Dubé,²⁶ have noted the oral tradition expressed in the tales and legends that circulated within the community. In their accounts, there are about a dozen legends dealing directly with the village, its inhabitants and their relations with the supernatural as represented by one of its agents, the devil.

The physical environment in which the village is situated makes it not unlike the hamlets found in tales of the Middle Ages. Caron stresses the isolation that makes it one of the most mysterious spots in Canada. And what about the local toponymy, which includes such revealing appellations as "Vente-au-diable" and, referring to the outlet of the Ruisseau des Forges, "Fontaine du diable"? Here we find men, women, workers, from various backgrounds and social classes, working at various trades. There are administrators: Bell, McDougall; craftsmen: woodcutters, carters, overseers, forgemen, blacksmiths; innkeepers and servants. Their work is tied up in the deafening movement of an industrial complex driven by a blast furnace, an upper forge, a lower forge and a tilt or helve hammer.²⁷ Between man and machine emerges the primordial element: fire. Fire gives life to all of these structures - fire that rises up like a volcano above the blast furnace, fire that runs this colossal undertaking, fire that imbues the workers with earthy colours and gives them an almost demonic appearance.

For anyone brought up in the rich Burgundian tradition, this diabolical setting lends itself to the creation of fantastic beliefs. The devil is *ipso facto* a part of daily life, as much by the variety of names under which he is known - l'gâbe, l'iâble, le beuglard - as by the forms he takes in popular imagination. At times he is likened to a beast; he becomes the great black cat lying by the blast furnace where the heat is so intense that no human being could endure it; the bear that crosses the village at noon on tiptoe or even the ox accidentally locked in a stable. At other times, he is incorporated in the operation of the machinery; he suddenly causes the noise of the large forge hammer or starts the fire in the stock of the blast furnace, a favourite place for him; each night he waits for the eleven o'clock casting to seek



Ruins of the blast furnace ca. 1915. (Collection Louise Trottier.)

refuge there.

Mostly, he is given a human form, sometimes humorous - as in the case of a man shaving himself outside on a frosty winter morning, sometimes dramatic - a black figure walking near the Vente-au-diable reckoning his accounts, or linked with certain trades such as the bucket carter seen descending a precipice. He intrudes on social activities - especially the frequent dances at the inn - that sometimes run over into the Sabbath. To earn its livelihood, the community has signed a pact with fire, and thus with its lodger, and will brave any terror in order to fulfil its obligations.

It is impossible not to see in these constant transformations a personification of the faults of the inhabitants of Les Forges. Self-acknowledged and thus legendary blasphemers, rowdies, drinkers and

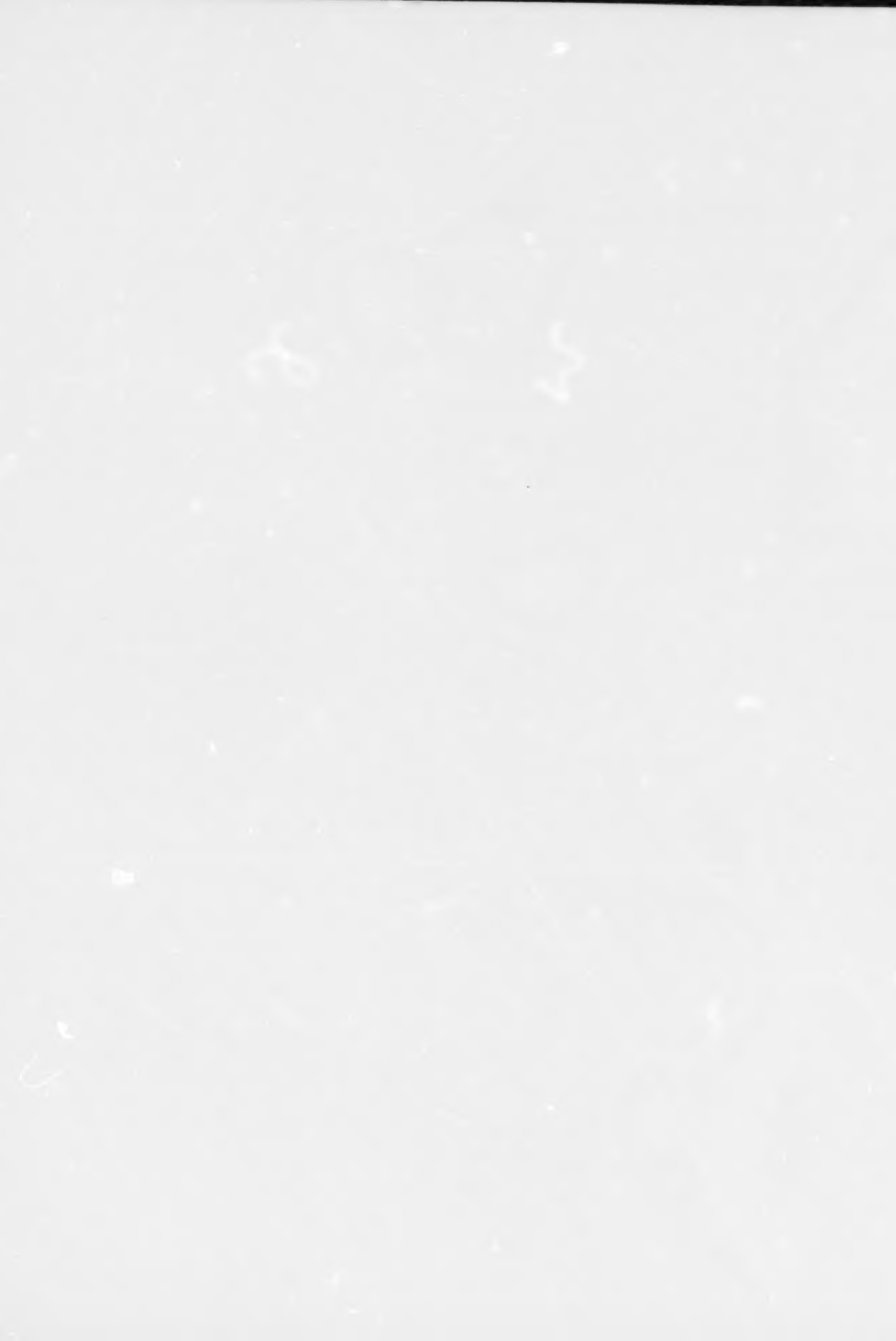
liars, they all seek an outlet admirably incarnated in none other than Satan. To this there appears an antithesis: the hero, Edouard Tassé. Exceptionally talented, with almost superhuman powers, the only person capable of opposing the demonic forces, he becomes the representative and agent of the community in its battle against its weaknesses. As seen by oral tradition, Tassé, the strong man of Les Forges, is a mixture of fact and fiction, the human and the fantastic, who dies an edifying death.

Other tales seem to derive from those reported above. For example, *Etincelles* by Moïsette Olier²⁸ strays from tradition to illustrate instead the ambitions and hard work of a young worker who becomes overseer of the enterprise. This plot allows the author to present a general picture of the work world, the social and religious activities and the mentality that prevailed at Les Forges around the mid-19th century.

The tales and legends reveal certain characteristics of the society of Les Forges, but many questions remain unanswered. The sources consulted earlier present a rather artificial picture and in many respects create the feeling of isolation, fear and mystery so often mentioned by the authors. Questions abound concerning the composition of the population, its daily occupations, its recreation, or its mental and religious attitudes. Rarely is anything heard about the people and most often they appear as a plaything in the hands of administrators greedy for power and money and conspicuous by their frequent absence, probably related to their great "social and economic mobility." Unlike the industry, about which much has been written, the people of this industrial community have received far too little study.



PART III THE IRON INDUSTRY: A COMPARATIVE STUDY



IRON INDUSTRY IN FRANCE

The establishment of Les Forges du Saint-Maurice might seem ahead of its time to those who normally associate this kind of phenomenon with the Industrial Revolution in the 19th century. In fact, it has a definite connection with the great international movement of scientific and technical discovery which took place at the beginning of the 18th century and some of the structural characteristics of the ironworks are actually of medieval origin.

Studies of Les Forges often mention that skilled workers were brought in from France or that some of the workers spent time training in New England. This gives some indication of the outside influences which may have operated on Les Forges at the beginning and perhaps throughout the life of the ironworks.

For purposes of comparison, we decided to examine the development of the iron industry in those countries which, for political, economic and geographical reasons, were most likely to have had contacts with New France in that regard, namely, France, Great Britain and the United States. In addition, we felt it would be useful to analyse the operation of certain industrial centres - Coalbrookdale in England and Maranec, Hopewell, Oxford and Saugus in the United States - to determine the similarities and differences between them and Les Forges du Saint-Maurice.

In his study entitled *L'industrie du fer en France*, which was published in 1922,¹ Jacques Levainville provides some relatively detailed information, especially in regard to the technological aspect. Using archaeological sources, he points out that hearths were used to make iron when Gaul was still in the Bronze Age. He goes on to describe the organization of metallurgy after the Roman Conquest and the introduction of the Catalan forge,² which was used in France until the 13th century.

In addition, the author studies the reasons for the development of the blast furnace, describes its structure and basic operation and tells where it was used and how its use started to spread in the 16th century. In regard to raw materials, he discusses the problems involved in mining the ore and manufacturing charcoal, with particular reference to ecological and territorial factors, and describes the remedial legislative action taken.

On the subject of labour, Levainville lists the main groups of workers associated first with portable forges³ and later with blast furnaces. He points out the extensive changes which took place in modern times in living and working conditions, the variety of trades and the establishment of guilds. The low wages offered resulted in the employment of agricultural workers and suggest a lack of skilled labour. He also shows how the forming of large monopolies encouraged the concentration of industry in certain regions and placed control in the hands of a small number of individuals who constituted the upper middle class.

This excessive regionalization inevitably resulted in very low production because the separation of the ironworks and the processing industries greatly reduced commercial transactions. Levainville explains how the large distribution centres were dependent on transportation routes to which access was often difficult.

The international tensions of the 18th century increased the demand for weaponry, which in turn magnified the demand for refined metal.⁴

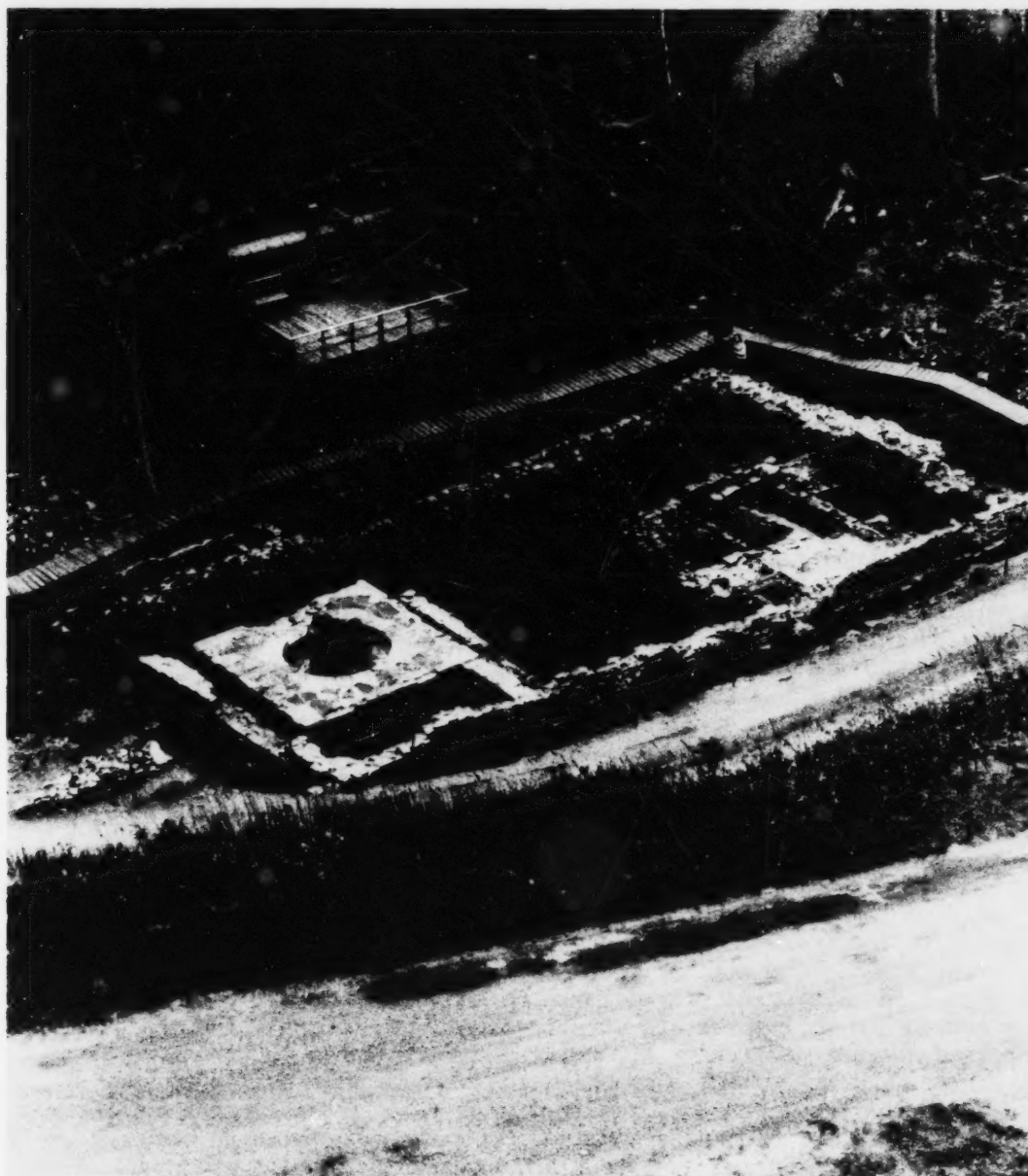
Unable to meet these requirements, the French industry encountered strong foreign competition. Examples are given showing the considerable decrease in the volume of exports.

In short, the iron industry in France could be described as very weak until 1789, both commercially and technically. The author notes that no significant changes were made to forges and furnaces between the 14th and 18th centuries. This was the case because France, unlike Sweden and England, did not feel the need to develop new industrial processes. According to Levainville, the Industrial Revolution did not really begin in France until 1782, when the first coke-fired blast furnaces went into operation at Creusot. Finally, Levainville describes the main stages in the increasing use of coke and the effect that mineral fuel had on the iron industry in the 19th century. In this regard, Levainville's monograph is certainly worth reading, for it succeeds in giving a fairly accurate summary of the development of the metallurgical industry in France.

Bertrand Gille's monograph entitled *Les Origines de la grande industrie du fer en France*, published in 1947,⁵ is highly specialized in nature. The author first gives a comprehensive survey of the development of the iron industry and its economic and social aspects up to 1661. He comments in particular on the gradual establishment of mining centres in Gaul, the changes brought about at the time of the Roman Conquest in regard to capital, labour and markets, and the complete destruction of this economic system as a result of various catastrophes which occurred during the Middle Ages.

On the technical level, Gille describes innovations which took place during medieval times: for example, the use of hydraulic power in the 12th and 13th centuries and the introduction of the blast furnace, which probably happened in the 15th century. He follows a description of developments in legal structures with a look at the organization of production. In this connection, the author explains the effect that feudalism had on labour and points to a rise in the co-operative movement beginning in the 14th century.

Gille next examines the major reorganization of the metallurgical industry initiated by Colbert in 1661. After explaining the minister's ideas concerning the economic role of the state, the author draws attention to legislative reforms which were made, the introduction of mercantilism, the positive effects of that system and the problems encountered, particularly in recruiting manpower and attracting private investment. He stresses Colbert's encouragement of the creation and integration of large companies and describes how those companies operated. He concludes by stating that the period between 1661 and 1730 was an important stage in the development of the iron industry in France, in both the stabilizing of prices and the reorganization of production. In spite of its ultimate failure, Colbertism did succeed in establishing a solid base for an industry which would continue to develop in the centuries to come.



Archaeological excavations on the site of the upper forge. The solid mass of masonry at the left is the remains of the blast furnace named the "new furnace" in 1881.

The second part of the monograph deals with the expansion of the iron industry in modern times and the principal factors influencing efforts to reach full capacity. The physical environment was of prime importance; the author analyses the process for the utilization of raw materials, including location, the legal and technical conditions governing extraction and processing, the requirements, the possibilities, the climatic and ecological problems and the protective measures taken. In addition, he explains the factors which limited the use of coal in France until the end of the 18th century.

After reviewing the technical works and writings relating to metallurgy which were influential at the time, he gives details concerning the blast furnace. He then describes the forge and its operation and mentions the research conducted by Réaumur into the manufacture of steel. He points out that mechanization was not very advanced in France and regretfully notes that the rolling mills⁶ were almost a complete failure.

Turning to the commercial aspect, Gille comments at length on the problems involved in marketing the products, namely the lack of markets and shortcomings in the routes and means of transportation. In the 18th century, the growth of the iron industry in France was hampered by intense regionalism, which affected the gross national product. Most of the ironworks operated simply to satisfy local requirements, which were extremely limited. Even though it was more developed because of the existence of large centres for the assembly, distribution and use of the products, the national market was affected by customs restrictions which increased the already fairly high prices of different types of iron. In terms of international trade, the volume of imports was as low as that of exports. Gille includes a statistical comparison of their percentages in France and England during this period.

The author attempts to explain these unfavourable economic conditions by attributing them to certain character traits - namely, a timidity on the part of French investors, who preferred safe investments to industrial ventures and centralization of money in Paris. He identifies the main investors who joined together in companies and criticizes the operations of those companies from the point of view of administration and distribution of capital. The founding of Creusot in 1780 is used as a point of reference to show how this type of business was formed and what interests were involved. In general, the state remained the main source of financial backing for the growing industry. After studying the criteria on which the state's role as lender was based and the types of subsidies it provided, Gille analyses the principal factors which affected the cost price: for example, raw materials, manufacturing equipment and transportation. A study of several balance sheets leads him to the conclusion that the iron industry in France at that time suffered from bad business management and the bankruptcies of creditors, which means that there was a lack of financial education on the part of the administrators and an insufficient supply of capital.

In regard to social conditions, the author points out that little had changed since 1661 and that the same solutions continued to be applied to the same problems. Comments on the number and distribution of workers in an ironworks point out the relative importance and weaknesses of the employees. Gille divides them into two categories - outside workers and inside workers - and identifies the specialization

and attitudes of each group. Basing his observations on the labour markets and inflexible labour laws, he denounces the insufficient supply of skilled workers. Despite inconsistencies in estimating wages because of regional diversity, the author is able to give a general idea of the basis on which wages were paid and explain how they varied according to the value of a worker's skills to the company. In regard to administrative superstructures, with the help of information gleaned from studies conducted in 1771 and 1788, the author identifies the owners of the ironworks as being members of the upper middle class. The appearance of big entrepreneurs with monopolies is associated with Colbertism. These entrepreneurs often came from the ranks of ironmasters who were of the old nobility, but their general lack of technical knowledge is pointed out.

One of the characteristics of large-scale industry is that it usually becomes concentrated in specific areas. The author therefore studies this process in various regions of France: Alsace, Hainault, Burgundy, Champagne, Franche-Comté, Brittany, Bordeaux and Normandy. He gives special attention to the Chaussade ironworks established in the province of Nivernais in 1720, describing its operation from the point of view of production, manpower, raw materials, wages, markets and so on. Similarly, he discusses the role of the Wendels in Alsace, who, like the McDougalls in Trois-Rivières in the 19th century, came to control a large part of the iron industry in France by 1789 after saving several ironworks which were in serious difficulty and were involved in the establishment of new industries.

However, the grouping together of all the processing operations was a very rare occurrence in the 18th century. Because of the decrease in the consumption of iron, finding a market became difficult. Most of the industrial establishments identified by the author which met these criteria were involved almost exclusively in the production of war material.

In large part a state enterprise, the large-scale iron industry in France was therefore firmly established by the end of the 19th century. The degree of technical expertise remained sporadic, but the industry was no longer a patchwork of small economic units. The social upheaval following 1789 greatly affected the legal structure of the companies and encouragement of their centralization in the Napoleonic period completed the transformation.

Even though Bertrand Gille's study was written some time ago, it still contains all the basic elements for further research in industrial history, in terms both of work tools and methodology - the extensively researched bibliography and the many statistical tables providing data on production, manpower and technology, for example - and of presentation. The major stages in the development of the metallurgical industry in France are carefully described, as is their context in the contemporary European economy. Clear and precise, this study accomplishes all it set out to do and is highly recommended to anyone interested in the history of science and technology.

We can easily see in the monographs written by Levainville and Gille the factors which were to influence the development of the iron industry in New France. Similarities in the establishment and political, social and technological evolution of ironworks in France and those on the Saint-Maurice already begin to appear. The similarities even extend to administrative, ecological, economic and structural

problems. Nevertheless, the history of metallurgy in Canada would be incomplete if we neglected to consider the industries in Great Britain and the United States, whose influence, through small centres of technological innovation, was felt most strongly in the 19th century.

IRON INDUSTRY IN GREAT BRITAIN

In 1924, Thomas Ashton, an author known for his works dealing with the Industrial Revolution,¹ published a retrospective study on the British iron industry.² The first section examines the use of charcoal from its beginnings until the 18th century, and is followed by a more specific discussion of the major discoveries foreshadowing the sweeping changes of the 19th century. In this context the author examines the experiments by Abraham Darby and Benjamin Hunstnan in connection with coke-fired smelting and steel, the work of James Watt, Matthew Boulton and the Wilkinsons in the invention of the steam engine and its application in the industry, the impact of these discoveries on the specialists directly involved, such as engineers and ironmasters, and finally the contribution made by Henry Cort, which related to puddling³ and lamination.

In dealing with economic aspects, Ashton relates the expansion of the iron and steel industry to international competition and examines its effect on trade policies, dealing specifically with fluctuations related to wartime and peacetime. From a social point of view, three different groups of people were affected: capitalists, whose political and industrial activities were by and large interdependent, and the ironmasters and the ironworkers, whose mobility, working conditions and wages Ashton analyses. Its subject matter, its comprehensive documentation and its many appendices and illustrations make this book an important reference source.

The British iron and steel industry developed mainly as a result of ambitious experiments carried out in small shops, complementing the extensive research done by contemporary scientists, with the aim of improving ore-processing techniques; these shops became the laboratories for the great scientific discoveries which gave rise to the Industrial Revolution. Among such enterprises was the Darby family firm which began operations, using charcoal-fired furnaces, at the end of the 17th century and continued until 1851. Both Arthur Raistrick⁴ and Barrie Trinder⁵ study the impact of this family's activities.

Three factors stand out as likely explanations for the Darbys' almost uninterrupted success. Their adherence to the Quaker faith, with which they maintained a relationship throughout their history, accounted for their personal discipline and that of their business associates and employees. The second factor, the physical environment in which the company developed, was of major importance; in the latter part of the 17th century there was a recovery in the iron trade related to the shift of manufacturing centres away from Sussex, The Weald and the Forest of Dean because of the need for an abundant supply of raw materials. Located in Shropshire on a tributary of the Severn River - one of England's largest waterways - Coalbrookdale accounted for 95 per cent of the region's coal production at the time. Finally, there was the scientific factor: Abraham Darby I had a continuing interest in research

and experimentation which constituted a kind of tradition that was carried on by his descendants and their associates.

Raistrick presents a survey of each successive administration, highlighting the salient information. He shows how Abraham Darby's family history, his apprenticeship with the Quakers in the iron trade and his activities in a brewery which he set up in Bristol led him, in 1709, to purchase a small ironworks in the very promising location of Coalbrookdale. Darby and his two partners in the company sought to eliminate the exorbitant costs involved in manufacturing charcoal and tried to find another way to smelt the ore by experimenting with coke and coal. These experiments met with success but were cut short by Darby's death in 1717.

His sons Abraham II and Edmond, having received a suitable education, took charge of the firm a few years later. The business was now firmly established. Its distinguishing feature was that it continued to be a family concern; this was made possible through marriages which were contracted with members of other important Quaker families. Using account books and statements, Raistrick discusses the various partnerships in the firm, the kinds of investments made and the many transactions carried out, which sometimes proved complicated - especially in the case of estate settlements. He deals with the firm's gradual expansion, accompanied by periods of economic fluctuation or depression, culminating in extensive changes in its financial and administrative structure at the end of the 18th century and in the 19th century.

He also discusses the personal and social aspects of the lives of the Darbys: marriage, births, deaths and their strong faith. He stresses the warm hospitality which characterized the Darby household and the moral virtues for which the family was renowned. This was expressed particularly in their friendly relationship with their workers. In fact, the workers lived in houses provided by the firm and apparently everything was done for their welfare. Raistrick cites the example of one of the directors, Richard Reynolds, who allowed them access to his property and had living quarters built for the elderly and destitute. In the 19th century new homes were built and steps taken to protect workers who were ill and to provide education for the workers' children.

Most of Raistrick's study is a thorough treatment of the firm's technological evolution and its growth, which were the result of continual effort on the part of its directors; for this reason most of his chapters attempt to retrace the role played by each of these men from the very first years of the Coalbrookdale complex. The author first describes the technical facilities which were gradually built beginning in 1708: for example, the construction, dimensions and operation of the blast furnace - inspired by one in Yorkshire - and its production between 1717 and 1728. He mentions the many experiments conducted during this early period in the use of coke as a fuel and their only partially successful results.

The abilities of Richard Ford, who ran the firm from 1718 to 1730, are acknowledged: the screw press was invented and the firm began casting rails for train tracks under his management. Experiments aimed at using pumps to regulate the bellows which form part of the furnace are associated with Abraham Darby II, who succeeded Ford in 1738. But the introduction of the steam engine in 1742 solved these problems. It

brought about major commercial and technical changes including the installation of new furnaces at Horsehay and Ketley. One of the main tasks of Richard Reynolds, who was appointed director in 1763, was to work along these same lines by linking Coalbrookdale with an industry in Wales. He is also credited with the construction of a railway at Horsehay in 1767. This foundry soon became the most important one in the region; in 1766, iron was being manufactured here in a reverberatory furnace⁶ and experiments were conducted using the rotary engine invented by Boulton and Watt.

In the 19th century the firm began testing and developing new types of machinery, in particular, the boiler, forge and rolling mill. It also introduced larger quantities of coke and the hot blast. The ironworks underwent expansion and new equipment was installed. It is possible to gauge the development of the industry using certain tables which give a general indication of the state of the ironworks, especially for the years 1760, 1784 and 1827.

However, Coalbrookdale's fame may be attributed to the introduction and, more importantly, the manufacture of the steam engine in the 18th century. Raistrick describes the first experiments in this area and stresses the importance of Newcomen's role. He then mentions how the engine was used at various stages by the Darbys and provides a number of details concerning its construction - which began as early as 1772 - and its application in 1742. On the basis of a number of accounts dating from the year 1748 to 1766 he is able to identify the purchasers of these engines and the effect of the expanded operations.

The period from 1772 to 1805 is very representative of the efforts of the firm, especially in its mills at Horsehay and Ketley, constantly experimenting and introducing technological improvements in production. Engineers and scientists such as Brindley, Watt, Hornblower and Trevithick made regular visits to the works, which became increasingly specialized in this field. The results are impressive if one looks at a table comparing the operations of the blast furnace using the air engine and the steam engine.

The company's performance is also impressive from the economic point of view. In the early years, production was limited to domestic goods; the Darbys, because of their religious convictions, refused all orders for weapons during the Seven Years' War.

The firm then began to manufacture various machine and steam engine parts which were to be used both in industry and in transportation. The author mentions the main accomplishments in this area: rails for train tracks and wagon axles and wheels, starting in 1767. In 1778, following a number of requests, an act was passed by the British Parliament granting the firm the right to build a canal to the Severn River. The author mentions the events leading up to this and the role played by Richard Reynold's son, William, who introduced the inclined plane. He also refers to the contribution made by the Darbys in the construction of other canals and describes the large-scale work required in the construction of an iron bridge in 1777-78 over this same river which led to remodelling of the Coalbrookdale ironworks.

In later years production centred around art castings. The Darbys were associated with architects such as John Nash and also brought in French designers in order to begin the production of cast-iron railings, gates, domes, an ornamental fountain, stove plates, fire grates and staircases. Examples of their work were received favourably at the Great Exhibition of 1851, held in London.

However, Raistrick provides very little information on the role of manpower at Coalbrookdale. Workers are mentioned mainly when the paternalistic attitudes of the directors are dealt with, but there are practically no statistics given on the number of workers or their occupations, working conditions and wages, except for a mention of the work done by children for the year 1772. It is also pointed out that during the steam era, in addition to the material products of the foundries and forges, Coalbrookdale contributed a number of well-trained workmen and engineers to the industry at large.

It is difficult to criticize Raistrick for having strayed from his subject matter, considering that his general intention was to deal with Coalbrookdale's scientific and technical history. For this reason he is not judged too harshly for not having dealt with the economic, social and political aspects. His work is important mainly because of the relevant documentation included in the appendices and the plans and illustrations of both this industrial site and the machinery which was manufactured.

In a retrospective work dealing with the iron industry in Wales, Morgan Rees⁷ mentions the centres which were very active there as early as the second half of the 16th century. Located in Glamorgan and Monmouthshire, they were the first in Wales to be financed from capital with the profit motive in mind. They were operated mainly by ironmasters who had moved from Sussex to Wales after official restrictions were placed on their activities in The Weald. Rees mentions the abundance of raw materials found in the Vale of Glamorgan and the Afon-Lwyd Valley and adds that the industry was composed of a number of small units because of its dependence on charcoal and supply problems. Following a description of the structure and operation of the blast furnace in use at Blaencanad and Angelton, he notes that with growing economic prosperity markets opened up in England and Ireland. He then analyses the ecological, economic and political factors which led to the substantial reductions of iron exports in the 17th century and notes that ironworks in Wales became fewer in number and more scattered. There are also a few brief descriptions of the blast furnaces at Caerphilly, Coed Ithel and Trellech and of the interesting industrial architecture at Llanelli.

In the 18th and 19th centuries, the Monmouthshire foundries were administered by leaseholders. Some foundries, including the one opened at Blaenavon in 1789, used techniques developed by the Darbys at Coalbrookdale, such as the use of coke as a fuel. Details which pertain to the structure and operations of the Surhowy and Rhymney Iron Company installations indicate that steam engines were used.

Technological innovation also characterized development in Glamorgan County during this time. Rees provides a brief description of the well-known establishments in the northern part of the county: he mentions the Dowlais, Penydarren, Plymouth and Cyfartha ironworks, their buildings, the raw materials they used and the transportation problems they faced. In the central part, the ironworks did not survive for very long, mainly for administrative reasons; however, in the western section a number of sites in the Tawe Valley were connected with technological developments. In some places there were attempts at smelting iron using anthracite. One such site, Ystalefera, established in 1838, had the markings of a modern industry but was not able to compete with the steel industry, which led to its decline in 1885. There were fewer ironworks



Archaeological excavations on the site of the lower forge. The refinery chimney was used to convert pig iron into iron. (Photo Parks Canada.)

in the north than in the south. While Bersham became famous as one of the cradles of the coke-smelting process, other places, such as Flintshire, specialized in the production of iron-manganese alloys in the 19th century. In addition to this technical survey, the author provides a description of the main tools used in the ironworks.

In spite of the fact that this study is about technological aspects, it must be recommended for its clear and concise presentation, its well-researched bibliography and its numerous illustrations.

In their respective works, Ashton, Raistrick and Rees present the development of the iron industry in Great Britain almost entirely from the point of view of scientific discoveries. The historian who launches into a reading of these works is immediately struck by this new dimension: the directors and ironmasters could be characterized more as scientists than as administrators. It may have been by chance that such a wide variety of iron products came to be manufactured, but another determining factor was the continued quest for scientific knowledge characteristic of the Age of Enlightenment.

These writers deserve credit for having accurately assessed the impact of the small firm on the rise of the Industrial Revolution. They also raise a great number of questions which relate to the impact of these discoveries abroad, in Canada for example. One such question pertains to technological development at Les Forges du Saint-Maurice in the 18th and 19th centuries, specifically with regard to the experiments carried out, the innovations which resulted and the way in which these affected the expansion of the iron and steel industry at the time. It can only be hoped that work will be forthcoming which will deal effectively with these unexplored areas.

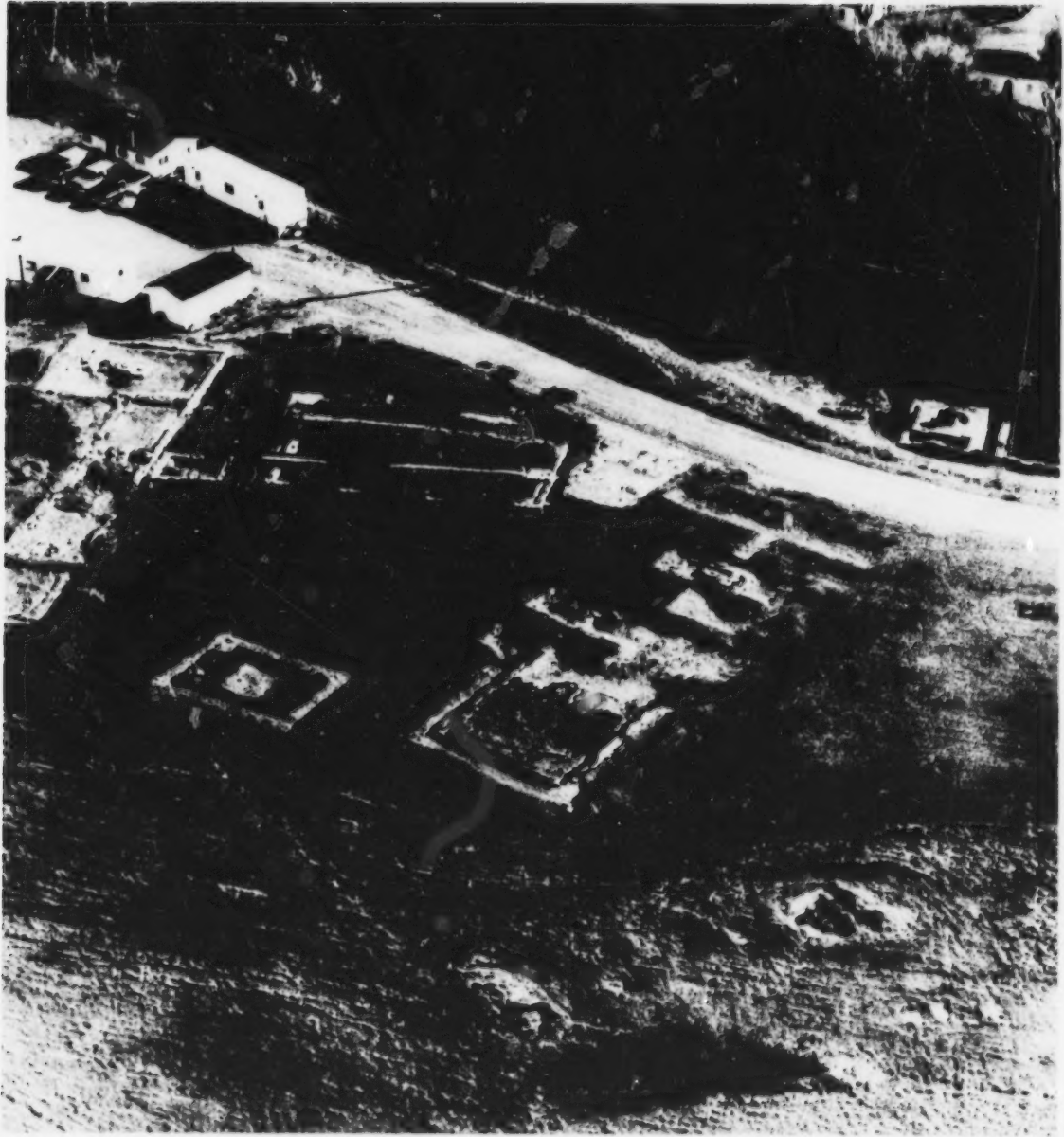
IRON INDUSTRY IN THE UNITED STATES

A great classic of metallurgical literature in the United States is Arthur Cecil Bining's monograph *Pennsylvania Iron Manufacture in the Eighteenth Century*, first published in 1938.¹ The author concentrated his research solely on the development of the iron industry in Pennsylvania, one of the best-known centres of that industry in the 18th century. He offers a retrospective look at the principal establishments which sprang up shortly after the first British explorers landed on North American soil.

Bining strongly doubts that American Indians worked iron before the arrival of the white man, although they did use certain oxides and meteoric rocks. He therefore starts with a description of the efforts of the Virginia Company of London as early as 1608; the Southampton Adventurers, a group of men with industrial leanings who located at Jamestown in 1622; the Company of Undertakers for the Iron Works, headed by John Winthrop, which set up operations on the Saugus in Massachusetts Bay Colony in 1629; and other companies established in New England in the second half of the 17th century, particularly in Connecticut, New Jersey and Rhode Island. Despite the presence of ore and several rudimentary ironworks, a series of problems hampered the growth of the industry for more than 30 years. The author next describes the main industrial centres of the 18th century and the factors involved in the establishment of the first bloomeries on the Schuylkill River, in the Coventry area, where the Bird family operations began in Hopewell in 1744, and in the Delaware, Susquehanna and Allegheny valleys.

Having determined that all the necessary materials for the manufacture of iron were available in abundance, Bining provides geological information concerning the composition of the ore and the principal places where it was mined. As to fuel, he describes the wood-charring process used at the time and suggests reasons why, in spite of experiments conducted in the use of coke by the Darbys, the American ironmasters preferred to use charcoal. He explains that the blast furnace was the result of a slow evolution from the Catalan forge of the Middle Ages to the German *stückerfen*² (for which he includes a structural analysis) and describes its operation, the machinery and manpower it required and the products manufactured. Except in the manufacture of nails and iron bars, very few innovations came out of the first part of the 18th century, for the first generation of ironmasters had technological problems to solve. In addition, the War of Independence retarded the progress of invention; several experiments aimed at perfecting the steam engine, which was introduced in America before 1775, proved unsuccessful.

Economic considerations arising from England's involvement in European conflicts and the resulting increase in demand for iron explain the many attempts made by that country to buy all the iron produced in



Aerial view of archaeological excavations undertaken on one part of the workers' living area at Les Forges du Saint-Maurice. The rectangular structures on both sides of the photo are the foundations of buildings used by the workmen's families in the 19th century. (Photo Parks Canada.)

the colonies and the legislative action taken to that effect. The iron industry was encouraged by the Board of Trade and preferential tariffs, but since the colony was unable to meet the needs of the mother country, the policy met with failure. The author analyses the effects of the breaking-off of diplomatic relations after the American Revolution: for example, the policy of protective tariffs introduced in 1780 and its repercussions for the entire country. He discusses the cost of production and the fluctuations in the price of iron in 1783 and deplores the lack of documentation which makes it impossible for him to describe changes in the volume of exports before 1770, a period during which Pennsylvania led the other colonies in that regard. The development of the iron industry actually facilitated the success of the separation from the mother country and the growth of most of the ironworks was encouraged by the manufacture of war material during the Revolution. The author describes the fluctuations in production between 1783 and 1810, noting a significant drop in exports to England, and points out the expansion of the industry beginning in this period.

The industry's administrative history is an interesting one. Bining describes the successes and failures of the various ironmasters. He summarizes the major obstacles to growth, which lay above all in a lack of capital. Raised from various sources, but most often from the formation of companies, capital was quickly used up, as large investments were needed to offset the cost of technical equipment. Lack of cash capital was a constant problem for the ironmasters, who were unable to obtain credit to meet their customers' requirements.

The labour system which developed in the American colonies was based on that of 17th-century Britain. However, the author shows how the status and conditions of labour were moulded to fit into the economy of a frontier country. Free from the restrictions of the European capitalist system, the ironworkers were a heterogeneous group. Their lack of qualifications sometimes led to the establishment of strict regulations. The author determines the reasons for the scarcity of manpower and then describes the ethnic origin of the workers, the duties of the apprentices and the skilled and unskilled workers, and their relations with the ironmasters. He studies the fluctuations in wages in relation to the cost of living and market prices and notes that wages were generally higher than those paid in Europe.

The employers, the ironmasters, were an equally disparate group. Bining describes their class backgrounds and points to the connections between the industry, agriculture and politics, citing, for example, the role of industrialists in the Pennsylvania Constitutional Convention of 1776. They were generally well educated and occasionally had a certain amount of scientific knowledge; they succeeded in building an industry within a structured community.

The iron industry in Pennsylvania was organized on plantations resembling the small feudal manors of medieval Europe. The author identifies their constituent parts: the homes of the ironmaster and workers and the ironworks itself. He describes daily life and work, goods and services provided, education, leisure activities (in particular those of the ironmasters, who imitated the life of English gentry), religious practices and general attitudes. Because of their isolation, many special legends and traditions grew up around these settlements.

Bining's work, which contains elements that might ensure a certain continuity in the presentation of an industrial village in 18th-century North America, makes a valuable contribution, both for the sources used and for the simplicity and accuracy of the text itself. All that remains is to apply this model to one of those early ironworking centres to determine its authenticity.

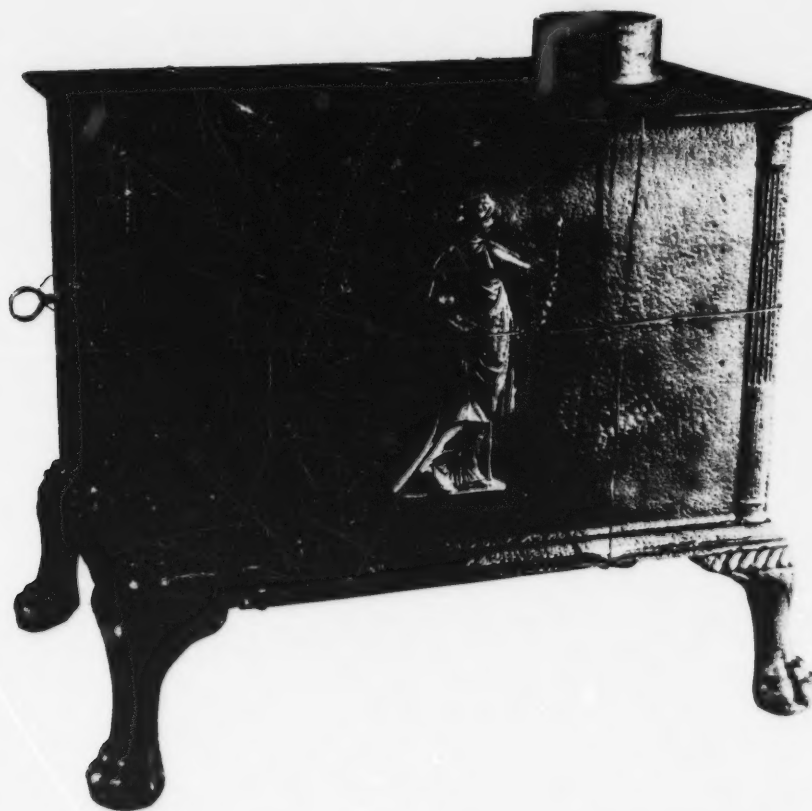
Composed of a group of Englishmen and residents of Massachusetts, the Company of Undertakers of the Iron Works in New England, founded in Saugus in 1644, was the prototype of American industry. In a study written some 20 years ago entitled *Iron Works on the Saugus*,³ E.N. Hartley describes the factors involved in its formation and growth and, finally, its decline around 1670. These factors, which gave the Saugus ironworks its unique character, were related to its administrative, economic, political, social and technological structures.

A very specific pattern is usually followed in undertaking a venture of this kind. The raw materials must be located and then the manpower and capital required to develop them must be found. This was certainly what was done in the case of the Saugus works. The author examines the main expeditions made to locate ore in America in the 17th century and identifies the differences in the goals which motivated the colonists of New France and New England. He points to the instability of their settlements and describes the steps taken by the Massachusetts Bay Company and its promoter, John Winthrop.

Hartley then analyses the organization of the Company of Undertakers - its probable shareholders, their reasons for investing in the company and their capitalistic aspirations. In this regard, he stresses the role of the Puritans, who formed the majority of the shareholders and who were imbued with a spirit of proselytism. New management was ensured following the division of the company into two centres, Braintree and Hammersmith, founded in 1645 and 1646 respectively. Hartley describes the actions of the principal directors and reveals the complexity of the administration - with owners in the mother country and in the colony - and the legal, technical and financial problems which led to the company's bankruptcy.

Hartley also mentions the involvement of the state through the granting of a monopoly to the company members, an action which involved both the mother country and colonial officials, and describes in detail the principal conditions and the advantages. In addition, he lists the responsibilities of each member in regard to the work carried out at Braintree and Hammersmith. The author examines a few figures from the company's books for the years 1651-52 and 1655 in order to assess the output of the two centres. Those figures suggest that the company had almost no net profit.

In summing up the problems inherent in the employment of skilled workers, Hartley identifies the main categories of workers to be found at Hammersmith, mentioning their places of origin, numbers, skills, wages and working conditions, taking into account both the supernumeraries and the regular full-time workers. He describes the workers' attitudes, pointing out that they were influenced more by their status as colonists than by their identity as Puritans. He also discusses the family, mentioning that some children were employed as apprentices. Everyone was supplied with food, lodging and services by the company.



Simple cast stove manufactured at Les Forges du Saint-Maurice, probably between 1799 and 1817. Note the neo-classical decorations created with paired fluted columns.

Most of the directors had some scientific knowledge. Evidence of this is the choice of location for the two centres and the type of industrial buildings constructed. Hartley follows their gradual installation; it would seem that a blast furnace was in operation at Braintree as early as 1644. However, Hammersmith, which was built the following year, looked more like a large factory, for the directors did not necessarily consider the application of the latest technology to be of prime importance. Most of the operations performed on the raw materials for the purposes of utilization and processing are described and many details are given concerning the machinery (blast furnace, forge, finery, chafery,⁴ casting works and reverberatory furnace) and its operation, as well as the buildings themselves. The author adds that archaeological information shows that Hammersmith was conceived as an integrated whole - a self-sufficient, articulated economic unit where raw materials would be transformed into finished products. Braintree, on the other hand, served as an auxiliary forge. In addition, Hammersmith helped to train a generation of workers who later moved to other ironworks in neighbouring areas.

Hartley therefore succeeds in convincing the reader that the metallurgical industry established on the Saugus illustrates the

transplanting of an advanced technology born in the developing iron industry in England and the culmination of the dreams of the explorers and inhabitants of the New World. He explains clearly how the small businesses in the United States of the 17th century were the product of a combination of religious, political and financial influences. His contention that the capitalist spirit sprang from the Protestant work ethic is largely based on Weber's thesis. Another interesting aspect of the work is Hartley's interpretation of the lifespan of the early ventures. He summarizes the factors which contributed to the short life and the failures of the first establishments and then attributes to them some of the successes in the 18th century. Nevertheless, one might regret that his ideological considerations take precedence over the more technical information one looks for in such a solidly documented work.

In contrast with Hartley's work, Walker's study of the industrial community of Hopewell, which was first published in 1967,⁵ is characterized by the variety of themes discussed. Describing the subject of his book, the author draws a distinction between the terms "village" and "community" and explains the way in which his account proceeds. The first part of the study gives a history of the Pennsylvania village from 1771 to 1883, and identifies the principal aspects which he later studies in detail from the economic as well as political and technological points of view.

He briefly describes the successive administrations, providing information about the establishment of the companies, the ways in which they were financed and managed, their uncertain prosperity, their financial difficulties and their reorganization. He credits the directors with the gradual improvement in the establishment's position. He discusses the reasons which led Mark Bird to choose the site he did, namely, the presence of raw materials, and their utilization, and makes some very interesting comments about the physical environment. The author analyses the effects which the need for a large quantity of charcoal to feed the blast furnace had on the area, the exploitation of farmland and forests and the resulting relationships between the farmers, the owners of the company and the inhabitants of the village.

Walker stresses the importance of the blast furnace and describes its operation, the length of time it operated according to the seasons, the outbuildings, the repairs it occasionally required and the effect of the resulting shutdowns. He reports the unsuccessful experiments of Clement Brooke, one of the Hopewell ironmasters, in the use of anthracite as a fuel (all available information suggests that charcoal was the predominant fuel during the entire period the works were in operation, as it is mentioned on a table for the year 1850) and describes technical changes related to the installation of a steam engine around 1878.

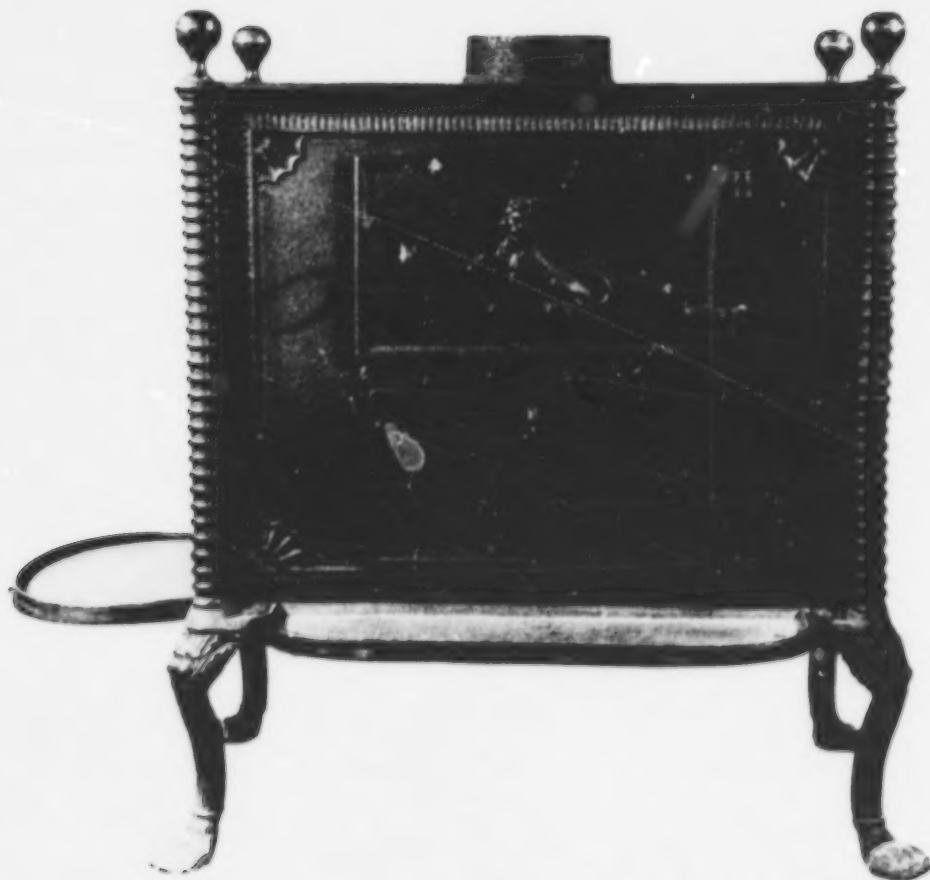
He notes little variety of output in the first years of production - with the exception of weapons cast during the War of Independence, the principal products of the works as early as 1772 were stoves. There was gradual diversification in the 19th century, however, when the focus shifted toward domestic objects, farm machinery and pig iron.⁶ He describes the fluctuation in prices and the factors that affected the circulation of money and contacts with outside markets: for example, depressions like that of 1838, armed conflicts and tariff policy. Walker also discusses internal economic influences. In the past devoted to "The Commercial Village," the author considers the company store,

which was sometimes the directors' only source of profit. He studies its major activities from the point of view of suppliers, customers, sales volume and prices, which are occasionally used on a comparative basis. Mention is made of an extremely interesting study conducted between 1831 and 1833 concerning the attitudes and requirements of consumers. All this is unquestionably connected with the matter of transportation, which is considered from the point of view of the development of roads and means of transportation, the expenditures and revenue involved and the market repercussions.

Manpower is discussed in "The Vocational Village." The operation of the blast furnace required a varied work force including highly specialized workers and day labourers, full-time and seasonal workers, who were all paid according to their responsibilities. The author studied all classes of employees during five periods of two blasts each between 1805 and 1853. He was thus able to identify 33 different categories of workers, for which he analyses the respective duties, wages, daily production and attitudes. Walker notes that the community's isolation and small population made possible very personal relationships between the ironmaster and his workers. Unlike the situation in Great Britain, there is no record of any strikes or major incidents of violence in Hopewell. Walker speaks of continued co-operation among employees and the organization of an ironmasters' association. He comments on the number of working days per year, the length of the working day, holidays, absenteeism and related fines, and concludes that employer-employee relations were of a paternalistic nature. He states that the supply of specialized workers was insufficient to meet demand in times of prosperity. He then describes the hiring procedures, which traditionally involved the families in the immediate area and their descendants, and occasionally black slaves and soldiers. He notes that the day labourers were a very mobile group and that they were sometimes in short supply.

Since most of the employees were obliged to live near their place of work, the author provides a detailed description of their homes, with accompanying illustrations, from the point of view of construction, furniture and domestic objects. He describes the differences in social status between owners, renters and boarders, and mentions a few points concerning food, heating and maintenance and rental costs. Some of these matters are also discussed with reference to the ironmaster's mansion, which was characterized by its size, elegance and triple role as residence, seat of authority and centre of social life.

Walker's analysis covers the entire Hopewell community, mainly from the point of view of its composition and the services offered to it. He devotes several pages to the black population, which was important both quantitatively and qualitatively, and stresses the industrial skills of its members. On the other hand, he points out that if Hopewell could be called a paradise for horses, it was hell for women: horses received the best of care, while women were expected to fend for themselves. He describes their principal occupations, be they traditional or professional, that is to say, associated with the home or the ironworks, the way in which they were compensated for their work and the privileges granted to them. In addition to studying their roles as wives, mothers and consumers, he considers their moral qualities and virtues. He also shows how children, including both boys and girls, were used in the work force in the 19th century, describing the tasks assigned to them in the



Fancy stove manufactured at Les Forges du Saint-Maurice between 1820 and 1840. (Photo National Museum of Man, Ottawa.)

industry and the community. These tasks required a certain amount of training and an allowance in compensation for them was paid to the parents.

Walker describes the administrator's concept of fringe benefits, stressing that relations among the people of Hopewell were based on mutual aid. Nevertheless, health services were offered and a school system was set up in the mid-19th century. Organized religion was also introduced at this time. Hopewell was served by travelling preachers in the early days, but on the insistence of the ironmasters, several churches were established around 1820. Assessing their effect on the people's conduct, the author states that according to tradition these iron industry settlements were rough and irreligious and that, to a certain extent, this was true of Hopewell. Leisure activities, charlatanism, superstitions and witchcraft are mentioned. The author also comments briefly on the presence of travelling salesmen, strolling players and faith healers and on the circulation of newspapers, magazines and a certain amount of religious literature distributed by colporteurs. However, he reaches no conclusion as to the influence these factors may have had on the behaviour of the people.

Walker's monograph is the most complete study of an industrial community one could hope to find. In fact, it is so complete that it is almost an encyclopedia. In producing a study, supported by archaeological and pictorial information and based on both primary and secondary sources, of the daily activities of a group of people whose lives were centred around an ironworks, Walker laid the foundation for later works with a multidisciplinary approach.

Historians are indebted to him because he did not concentrate solely on events, but also described the continuity of experience, giving information which may be more prosaic but which is of primary importance to the space-time aspect of social evolution. However, from a historian's point of view, there are several unfortunate gaps in the author's rather modest conclusion, which makes no attempt to explain the effect of the closing of the works, especially in regard to the environment, the probable migration of people from the settlement or even the influence on technological development in neighbouring areas. Nevertheless, this type of work makes worthwhile reading. Could it be that the author had so little difficulty describing the community of Hopewell because it was so clearly structured?

According to James Norris,⁷ the Maramec ironworks founded by Thomas James and Samuel Massey on the river of the same name in the Mississippi Valley at the beginning of the 19th century presented all of the characteristics of a frontier industry. In a short book, Norris describes the principal distinguishing features of this undertaking between 1826 and 1876. He comments briefly on the building of the industrial structures (the blast furnace, the *tuyères*,⁸ the hammers and the refinery or chafery) and their operation. As to the use of raw materials, he describes the wood-charring process, calculates the amount of charcoal consumed daily by the furnace and the fuel bill, and gives examples of seasonal production. He notes the disastrous effect that the use of charcoal had on the environment. Having listed the kinds of trees which were to be found in the area, he describes as suicidal destruction the gradual depletion of the forest resources.

The trees were cut by farmers who worked as part-time lumberjacks. Norris analyses the geographical and economic conditions which positively or negatively affected the recruiting of manpower during this period: for example, the boom in the West, the depression in the East and the building of the railroad. He tells what areas the workers came from and explains the types of work they did, with special attention to the specialized tradesmen on the one hand and the day labourers recruited among black slaves on the other. He describes wages, working conditions and length of employment, including information on women and children.

Like all frontier enterprises, Maramec suffered from a chronic shortage of labour throughout its history. However, Norris points out that the store established in 1842 quickly showed a profit and that it had a large market in the southeastern United States. In addition, he mentions the tactics used by William James to ensure the stability of his work force, stating that the organization of the business was almost feudal in nature, since, among other reasons, all of the property belonged to the company. Little is known about the activities of the people in this settlement. Besides a few registers of baptisms, marriages and burials, there are only a few vague references to the people's attitudes and their leisure activities in the various seasons.

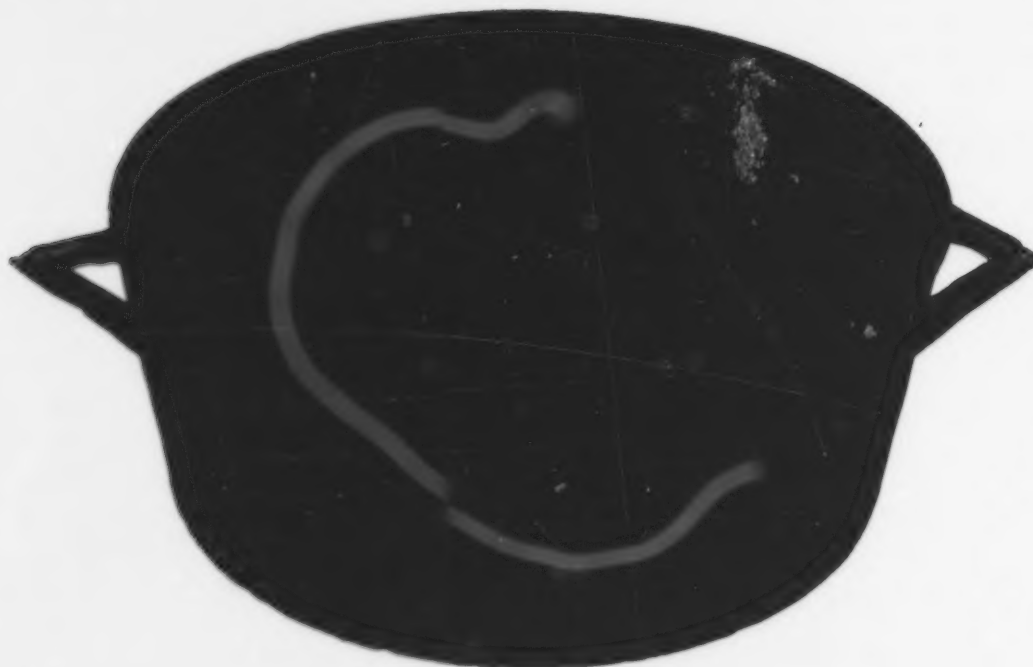
This short work, documented from very specialized sources, is designed more as a brief description of the Matanec works than as a detailed study. It does provide some worthwhile information concerning certain technical installations and the variety of craftsmen associated with them. It would be interesting to know whether the author based some of his report on archaeological information, or whether he concentrated solely on sources in local archives. The Matanec works may not have been very important in comparison with the large centres of the iron industry at the time; its significance lies in the fact that we know something about it.

The Tredegar Iron Works, founded south of the Potomac, in Richmond, Virginia, is believed to be the oldest ironworks in that part of the United States. In a classic work of economic history entitled *Virginia Iron Manufacture in the Slave Era*, Kathleen Bruce⁹ recalls the highlights in the history of the undertaking, which began with the union of a forge and a rolling mill in 1837. She provides details concerning the administrative organization of the works, describing the company's deed of incorporation and the rights and obligations of the shareholders and their commercial agents. She occasionally discusses the company's successes and financial difficulties, which led to the winding-up proceedings in 1865.

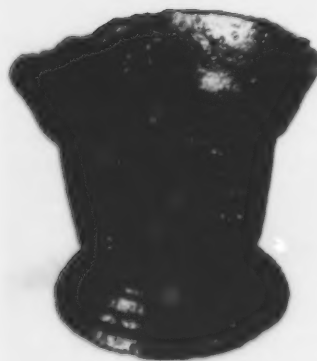
The author spends little time discussing technical considerations, although she does mention the quality of the charcoal manufactured in Richmond and speaks of the condition of the machinery, basing her comments on certain reports which appeared between 1838 and 1847. She devotes more time to the products which came out of Tredegar: bar and sheet iron, farm machinery and especially weaponry. The American government became the ironworks' principal customer for arms. A cutter was built for the government in 1844. After 1860, Tredegar became the major supplier of arms for Virginia and the entire southern Confederacy. Nevertheless, the works could not have survived solely on the basis of government contracts. It found a metropolitan market in New England, and certain balance sheets drawn up between 1840 and 1850 show that the demand was greater in the North than in the South. The author attributes the success of the works to its expansion in 1845, when it joined with two other undertakings, and assesses the beneficial effects of that expansion following the great industrial depression of 1849-50. She bases her assessment on a table showing production and profits between 1844 and 1852.

The success of the ironworks is also attributed to the use of slave labour after 1843. After listing the chronic problems inherent in using white workers, the author discusses the potential of black labour from the point of view of specialization, the cost of buying and keeping slaves, wages, production and profitability. In fact, cheap labour is considered here to be a form of property offering many economic and social advantages. In this regard, Bruce discusses the relationships between the master and his workers, the daily activities of the workers and the disciplinary requirements and their effects.

Industrial slavery is also the subject of an article by Charles Dew which appeared in 1974.¹⁰ The article, which is based on the letterbook of David Ross, one of the richest Virginia planters, who also owned the Oxford Iron Works, is an important document that describes the life of the black workers employed at Ross's works in 1812 and 1813. Dew reviews the tactics used by Ross to maintain the very difficult



Cast-iron pot. Fine example of products sold by Les Forges. (Photo Parks Canada.)



Cast-iron mortar for the preparation of medication. Manufactured and sold by Les Forges. (Photo Parks Canada.)

balance between coercion and reward. Generally speaking, they were based on encouragement and mutual trust, but especially on the vital role of the family in education, discipline and stability.

Dew shows how Ross's choice was dictated by the great range of skills possessed by the blacks. He lists the main trades in which they excelled, and then describes the tasks which were given to the women and children, as well as the allowances received. In order to illustrate Ross's attitude regarding the motivation of his employees, the author cites the example of a young potter who was allowed to put his own stamp on the items he made. Rewards and incentives of this kind were to become central features in the functioning of slavery in the iron industry in the southern United States after the Revolution.

Because of their originality, the studies by Bruce and Dew are worthy of consideration by those particularly interested in the social history of workers. They provide a basis for comparing the characteristics of the labour market in capitalist, feudal and slave systems and a means of determining the effects of each system on the individual worker, be he black or white, slave or company property, from the point of view of his motivation, needs, aspirations and supposed emancipation in modern industry.

All of these works dealing with the American iron industry from its early days to the mid-19th century show its diversity and explain how European methods were adapted to the North American environment. For example, it is interesting to note the English influence in the methods used and especially in the scientific interests of the founders of the various companies. Experiments and discoveries in Britain were often applied almost simultaneously in the United States. In fact, we have seen that there was probably a certain amount of rivalry in regard to technological innovations.

There is a notable similarity in the approach taken by almost all of these authors, who base their work on scientific information and, whether consciously or not, follow the model established by Bining, even though the latter discussed only one region. We can therefore conclude that his criteria were valid.

Each of these writers nevertheless succeeds in highlighting some particular aspect of the industry without removing it too much from the economic, political, social or technological context. Since little is said about their reasons for writing the works, we can assume that the authors had an academic interest in contributing to the body of literature on the iron industry.

CONCLUSION

Les Forges du Saint-Maurice, as an industrial enterprise and community spanning 150 years, has earned an important place in our history, justifying the present summary of works written about the undertaking. We thought it best to begin by putting the ironworks in a regional context, that of the Mauricie; and we felt that ample information and opinions about the region and its physical, industrial and human environment were essential in reconstructing the setting in which the industry was established. Such an analysis then made it easier to distinguish the themes found in the various writings which discussed the ironworks directly - from political, economic, social and cultural points of view keeping in mind the main events in the history of the ironworks. Finally, we attempted to place Les Forges in an international perspective by reviewing some studies of the iron manufacturing industry in France, Great Britain and the United States. In this way we were able to measure the influence of other undertakings, both large and small, and especially the impact of scientific discoveries on Les Forges.

Most of the studies of Les Forges du Saint-Maurice are in keeping with Canadian historical tradition, but there are others that should be produced in order to do Les Forges full justice. Traditional history is by definition restricted to the recounting of facts and political events, and to reject this basic approach would be to reject a whole infrastructure. However, is it not also true that history is in essence the study of changes? And what could be more significant than the history of an industry in measuring the development of a country and a society over a given period? Today history is adopting new approaches and new subject matter; it is taking on a scientific aspect. Modern history is associated with varied disciplines in the pure and applied sciences and the humanities. This multidisciplinary approach must be taken into account by the present-day historian who is committed to searching out the truth in the study of Les Forges du Saint-Maurice.

Such an approach will even require a different methodology. In addition to written or pictorial documents from archival or library holdings, the modern historian will turn to archaeological material or the results of oral investigations, and will perhaps need the assistance of a computer to interpret the data gathered from these sources. These methods will bring to light a wide range of themes which could keep researchers busy for as long a period of time as the ironworks operated.

In so far as the land is concerned, the historian could describe the original site of the undertaking, its expansion and modifications, the key roles played by certain directors and owners, and the effect of the industry on settlement of the surrounding area. This could easily be connected with an examination of the natural environment including geological, biological, botanical and climatological aspects (for

example, the formation of physical features and the river system, soil composition, vegetation, the growing time of trees and climatic history). Such questions lead directly to ecological considerations - the percentage of land used by the ironworks, its justifications and the exhaustion of mineral and forest resources.

A discussion of the land might well also touch on the mining, use and transformation of raw materials. The historian would thus delve into metallurgy, chemistry and physics. From the technological point of view, he might describe the machinery and buildings used in the iron industry (blast furnace, forge, hammer, waterpower), their functions and how they operated, and at the same time draw comparisons with countries where the scientific discoveries were made. Consideration of the structural aspect might also lead him into the field of art history - specifically, architecture - as he examined the construction techniques used in the industrial buildings (mills, bakery, stables, and so on) as well as in the owners' and workers' living quarters.

The daily lives of the inhabitants could also be the object of study, involving research in the areas of ethnology and material culture - the interior arrangement of the houses, furniture, household items and tools. The quantitative and qualitative aspects of this community would be part of a social history which would include demographic studies to determine the origins and movements of inhabitants and population levels at different periods. The professional composition of the population could also be researched to find the main specialized or non-specialized trades practised and the role of women and children. A social history would also use sociological and anthropological concepts to study the services offered, recreational activities and beliefs. Legal documents and proceedings - trials and orders - would be examined to gain insight into the mentality of the people.

It would be the job of the historian-economist to describe the administrative and financial operations of the industry, especially the matters of price and wage regulation and the circulation of currency. Such a specialist might also determine the state of production and markets and the volume of exports and imports at different periods, and might analyse any information falling under the heading of labour relations. In sum, his role would be to evaluate the industry's economic potential at both national and international levels.

The history of Les Forges du Saint-Maurice as an industrial centre is therefore still waiting to be written. Breaking out of the rigid political, narrative mould, it will be a multifaceted enterprise entailing a series of specialized studies. While of undeniable academic interest, these works, inspired by the tremendous efforts of a community to establish and run an undertaking which would give it a solid social and economic base, will have to turn again to the people, so that they may know something of their cultural heritage.

ENDNOTES

Part I The Saint-Maurice Region - General and Specialized Studies

The Physical Environment

- 1 Stanislas Drapeau, Etudes sur le développement de la colonisation (Quebec City: Brousseau, 1863).
- 2 Stanislas Drapeau, Le guide du colon français, belge, suisse (Ottawa: October 1, 1887).
- 3 Thomas Boucher, Mauricie d'autrefois (Trois-Rivières: Editions du Bien Public, 1952).
- 4 Raoul Blanchard, Le Centre du Canada français (Montreal: Librairie Beauchemin Limitée, 1947).
- 5 Stanislas Drapeau, Etudes sur le développement de la colonisation, (Quebec City: Brousseau, 1863).
- 6 Armour Landry, Bribes d'Histoire (Trois-Rivières: Editions du Bien Public, 1932).
- 7 Benjamin Sulte, "Le Bas Saint-Maurice," Bulletin de la Société de Géographie de Québec (BSGQ), Vol. 5, No. 1 (Jan. - Feb. 1911), pp. 37-39.
- 8 Albert Tessier, "De Jacques Buteaux à l'arpenteur Bouchette," Les Cahiers des Dix (CD), No 4 (1939), pp. 223-42; "Encore le Saint-Maurice," CD, No 5 (1940), pp. 145-75.
- 9 Canada, Department of Agriculture, La vallée du Saint-Maurice: informations pour les colons (Ottawa, 1887).
- 10 Napoléon Caron, Deux voyages sur le Saint-Maurice (Trois-Rivières: Librairie du Sacré-Coeur, ca. 1889).
- 11 Raoul Blanchard, La Mauricie (Trois-Rivières: Editions du Bien Public, 1950), pp. 29-46. For further information see Peter B. Clibbon, "Utilisation du sol et colonisation de la région des Laurentides centrales," Geographical Bulletin, No 21 (1964), pp. 5-20.
- 12 Ernest Pageau, Etudes pédologique des comtés de Trois-Rivières et de Saint-Maurice, Bulletin technique No. 14 (Quebec City: Department of Agriculture and Colonization, Soil Division, Research Branch, 1967). See also N.R. Gadd, Géologie de la région de Bécancour, Québec (dépôts meubles) (Ottawa: Geological Survey of Canada, 1960) and Gérard Godbout, Etude pédologique des comtés de Champlain et de Lavolette (Quebec City: Department of Agriculture and Colonization, 1967).
- 13 Emmanuel Leroy-Ladurie, Histoire du climat depuis l'an mil (Paris: Flammarion, ca. 1967).

The Industrial and Human Environment

- 1 Raoul Blanchard, La Mauricie (Trois-Rivières: Editions du Bien Public, 1950).

- 2 Pierre Dupin, Anciens Chantiers du Saint-Maurice (Trois-Rivières: Editions du Bien Public, 1935).
- 3 Canada, Department of Agriculture, op. cit.
- 4 Thomas Boucher, op. cit.
- 5 Canada, Department of Agriculture, op. cit.
- 6 Iron deposits found in marshy areas. The iron extracted from these deposits is referred to as "bog ore."
- 7 E.Z. Massicotte, "Historique de la paroisse Saint-Maurice, Comté Champlain," Bulletin des recherches historiques (BRH), Vol. 35, No 5 (May 1927), pp. 292-304.
- 8 S.A. Dresser and T.C. Denis, La géologie du Québec (Quebec City: R. Paradis, King's Printer, 1941).
- 9 Jacques Béland, Rapport géologique 97: Région de Shawinigan, Comtés de Saint-Maurice, Champlain et Laviolette (Quebec City: Department of Natural Resources, 1961).
- 10 James Herbert Bartlett, The Manufacture, Consumption and Production of Iron, Steel and Coal in the Dominion of Canada (Montreal: Dawson Brothers, 1885).
- 11 Michel Bibaud, La bibliothèque canadienne, Vol. 2 (Montreal: Imprimerie J. Lane, 1825-26).
- 12 E.Z. Massicotte, "Notes sur les forges de Ste-Geneviève de Batiscan," BRH, Vol. 41, No 10 (October 1935), pp. 708-11.
- 13 Thomas Boucher, op. cit.
- 14 W.J.A. Donald, The Canadian Iron and Steel Industry (Boston: Houghton Mifflin, 1915).
- 15 J.-E. Bellemare, "Les vieilles forges Saint-Maurice et les forges Radnor," BRH, Vol. 24, No. 9 (September 1918), pp. 257-70. See also Radnor: 60 ans de progrès 1894-1954 (n. p., n. p., ca. 1955).
- 16 To Commemorate the Visit of the Members of the International Mining Convention of 1893 to Radnor Forges (n. p., Feb. 25, 1893). Part of this work is included in "The Story of Radnor Forges," Iron and Steel of Canada, Vol. 17, No. 2 (March-April 1934), pp. 24-27.
- 17 David J. McDougall, "The final half-century of charcoal iron production in Quebec - 1861 to 1911," Canadian Mining Journal (CMJ), (August 1971), pp. 1-4.
- 18 Prosper Cloutier, Histoire de la paroisse de Champlain, Vol. 2 (Trois-Rivières: Editions du Bien Public, 1915).
- 19 Marcel Pratte, Un siècle d'Histoire (Saint-Etienne-des-Grès) (n. p., n. p., ca. 1959).
- 20 Stanislas Drapeau, Etudes sur le développement de la colonisation, (Quebec City: Brousseau, 1863).
- 21 Thomas Boucher, op. cit.
- 22 Ibid.
- 23 Napoléon Caron, op. cit.
- 24 Canada, Department of Agriculture, op. cit.
- 25 Benjamin Sulte, Chronique trifluvienne (Montreal: Compagnie d'Imprimerie canadienne, 1879).
- 26 Antoine Roy, "Recensement des habitants de la ville et du gouvernement des Trois-Rivières," Rapport de l'archiviste de la province de Québec pour 1946-1947 (RAPQ), pp. 3-53.
- 27 Prosper Cloutier, op. cit.
- 28 Father E. Hamelin, La paroisse de Champlain (Trois-Rivières: Editions du Bien Public, 1933).
- 29 Thomas Boucher, op. cit.

- 30 Albert Tessier, D.P., "La cité trifluvienne vue par M. Smith et Miss Fenton (1892-1894)," CD, No 18 (1953), pp. 113-127.

Part II The Industrial Community of the Forges du Saint-Maurice - Specialized Studies

Overview

- 1 Benjamin Sulte, Les Forges Saint-Maurice, Mélanges historiques, Vol. 6 (Montreal: G. Ducharme, 1920).
- 2 Albert Tessier, Les Forges Saint-Maurice, 1729-1883 (Trois-Rivières: Editions du Bien Public, 1952).
- 3 Albert Tessier, "Minéraux de basse étoffe," CD, No 11 (1946), pp. 119-40; "Débuts pénibles de l'industrie lourde au Canada," CD, No 12 (1947), pp. 53-73; "Le roi s'en mêle," CD, No. 13 (1948), pp. 63-83; "Les Anglais prennent les forges au sérieux," CD, No. 14 (1949), pp. 165-185; "Le dernier demi-siècle des forges (1833-1883)," CD, No. 15 (1950), pp. 163-83.
- 4 Albert Tessier, "Aux sources de l'industrie américaine," Les Cahiers Reflets, Vol. 1, No. 3 (January 1945), pp. 5-35.
- 5 Albert Tessier, Les Forges Saint-Maurice (Trois-Rivières: Editions du Bien Public, 1952).
- 6 Albert Tessier, "Aux sources de l'industrie américaine," Les Cahiers Reflets, Vol. 1, No. 3 (Jan. 1945), p. 5.
- 7 J.-E. Bellemare, *op. cit.*
- 8 R.P. Lejeune, Dictionnaire général de biographie, histoire, littérature, etc, Vol. II (Ottawa: University of Ottawa, 1931).
- 9 James Swank, History of the Manufacture of Iron in All Ages and Particularly in the United States from Colonial Times to 1891. Reprint of 1892 edition (New York: Burt Franklin, 1964).
- 10 Pierre-Georges Roy, Les petites choses de notre histoire (Lévis: n. p., 1928).
- 11 Valois de Valoisville, "Les Forges de Saint-Maurice," BRH, Vol. 15, No. 10 (Oct. 1909), pp. 318-19.
- 12 James H. Bartlett, *op. cit.*
- 13 B.F. Townsley, Mine finders: The History and Romance of Canadian Mineral Discoveries (Toronto: Saturday Night Press, 1935).
- 14 William J.A. Donald, *op. cit.*
- 15 Geo. H. Macaulay, "The Iron Mine of the St. Maurice Territory," British Canadian Review, Vol. 1, No. 2 (January 1863), pp. 43-52.
- 16 James H. Bartlett, *op. cit.*
- 17 Desmond Killikelly, "The Steel Industry of Canada," Canadian Geographical Journal (CGJ), Vol. 16, No. 5 (May 1938), pp. 213-46.
- 18 Hervé Biron, "Les Forges Saint-Maurice," Perspectives, No. 13 (March 1962), pp. 10, 12, 30, 31.
- 19 Michel Gaumond, "Les Forges du Saint-Maurice," Vie des Arts, No. 50 (Spring 1968), pp. 46-51; *idem*, Les Forges du Saint-Maurice (Quebec City: Société historique de Québec, 1968).
- 20 Michel Bibaud, *op. cit.*
- 21 George M. Grant, ed., Picturesque Canada: The Country As It Was and Is, Vol. 1 (Toronto: Belden Brothers, 1882).
- 22 Sidney L. Irving, An Adventure of Iron Men in a World of Iron: The Romance of the Saint-Maurice Forges (Trois-Rivières: Académie D L S, 1934).

- 23 Yvon Thériault, Trois-Rivières, ville de reflet (Trois-Rivières: Editions du Bien Public, 1954).
- 24 Trois-Rivières Chamber of Commerce, Projet de reconstruction "Les Forges Saint-Maurice, 1729-1883" (Trois-Rivières, 1963).
- 25 Geo. H. Macaulay, op. cit.
- 26 Fred C. Wurtele, "Historical Record of the St. Maurice Forges, The Oldest Active Blast-Furnace on the Continent of America," Proceedings and Transactions of the Royal Society of Canada for the Year 1886, Vol. 4 (1887), Section 2, pp. 77-89.
- 27 James H. Bartlett, op. cit.
- 28 Napoléon Caron, op. cit.
- 29 W.J.A. Donald, op. cit.
- 30 "The Forges of the St. Maurice," Iron and Steel of Canada, Vol. 15, No. 11 (November 1932), pp. 133-36.
- 31 R.C. Rowe, "The St. Maurice Forges," OGJ, Vol. 9, No. 1 (July 1934), pp. 14-22.

Industrial Structures

- 1 Joseph-Noël Fauteux, Essai sur l'Industrie au Canada sous le Régime français, Vol. 1 (Quebec City: Ls-A Proulx, 1927).
- 2 Gérard Filteau, La naissance d'une nation: Tableau du Canada en 1755, Vol. 2 (Montreal: Editions de l'A.C.F., 1937).
- 3 Cameron Nish, "La banqueroute de François-Etienne Cugnet," Actualité économique (AE), Vol. 41, No. 1 (April-June 1965), pp. 149-202; No. 2 (July-September 1965), pp. 347-78; No. 4 (January-March 1966), pp. 762-810; Vol. 42, No. 1 (April-June 1966), pp. 161-208; No. 2 (July-Sept. 1966), pp. 391-422; No. 3 (Oct.-Dec. 1966), pp. 704-27; "François-Etienne Cugnet et les Forges de Saint-Maurice: un type d'entrepreneur et d'entreprise en Nouvelle-France," AE, Vol. 42, No. 4 (Jan.-March 1967), pp. 884-97.
- 4 Cameron Nish, François-Etienne Cugnet, Entrepreneur et entreprises en Nouvelle-France (Montreal: Fides, 1975).
- 5 Small masonry forges in which iron is manufactured using the direct-reduction process. They cannot produce pig iron, which can be made only in a blast furnace.
- 6 Ramsay Traquair, No. 92 St. Peter Street, Quebec: A Quebec Merchant's House of the XVIIIth Century, Series XIII (Art and Architecture, No. 27 Montreal: McGill University Publications, 1930).
- 7 In this connection, it might be pointed out that in his account of his 1667 exploration, ironmaster Hameau suggested that a forge be established "sur la rivière Etchemin à une lieue de Québec..." and not on "la rivière et le chemin..." (Cameron Nish, op. cit., p. 39).
- 8 H.C. Pentland, "The development of a capitalistic labour market in Canada," Canadian Journal of Economics and Political Science, Vol. 25, No. 4 (November 1959), pp. 450-461.
- 9 David Lee, "A Short History of the St. Maurice Forges," Miscellaneous reports on sites in Quebec (Parks Canada, Manuscript Report No. 132), pp. 97-120.
- 10 Maurice Fillion, La pensée et l'action coloniales de Maurepas vis-à-vis du Canada 1723-1749 (Montreal: Léméac, 1972), pp. 301-28.

- 11 Filion uses Fauteux's work as a source but does not quote it accurately. For example, see p. 304 where he cites Fauteux as saying that Francheville's death occurred September 30, 1733 - then see Fauteux, *op. cit.*, p. 64.
- 12 Marcel Trudel, Le Régime militaire dans le Gouvernement des Trois-Rivières, 1760-1764 (Trois-Rivières: Editions du Bien Public, 1952); "Les Forges Saint-Maurice sous le Régime militaire (1760-1764)," Revue d'Histoire de l'Amérique française (RHAF), Vol. 5, No. 2 (Sept. 1951), pp. 159-185; "Le gouvernement des Trois-Rivières sous le Régime militaire (1760-1764)," RHAF, Vol. 5, No. 1 (June 1951), pp. 69-98.
- 13 David J. McDougall, "The final half-century of charcoal iron production in Quebec - 1861 to 1911," CMJ (Aug. 1971), pp. 1-4.
- 14 Marcel Pratte, *op. cit.*
- 15 Hormisdas Magnan, Dictionnaire historique et géographique des paroisses, missions et municipalités de la province de Québec (Arthabaska: l'Imprimerie d'Arthabaska Inc., 1925).
- 16 Prosper Cloutier, *op. cit.*
- 17 E.Z. Massicotte, "Historique de la paroisse Saint-Maurice," BRH, Vol. 35, No. 5 (May 1929), pp. 292-304; No. 6 (June 1929), pp. 336-47.
- 18 Roy C. Dalton, The Jesuits' Estates Question 1760-1888 (Toronto: University of Toronto Press, 1968).
- 19 Thomas Boucher, *op. cit.* See also Saint-Boniface de Shawinigan 1859-1959 (Les Editions Lacoursière Inc., J.P. Lacoursière, Publisher, 1959).
- 20 J.B.A. Ferland, Cours d'Histoire du Canada (Quebec City: Augustin Côté, 1865); Jean Hamelin, Economie et Société en Nouvelle-France (Quebec City: Presses de l'Université Laval, 1960); N. Le Vasseur, "Mines de marais et les anciennes forges Radnor," BSGQ, Vol. 5, No. 3 (May-June 1911), pp. 185-92; Paul-Émile Renaud, Les origines économiques du Canada: l'oeuvre de la France (Mamers: Gabriel Enault, 1928).
- 21 Joseph Obalski, Industries minérales de la province de Québec, Canada (n. p., n. p., Jan. 1900).
- 22 Harry Miller, Canada's Historic First Iron Castings: A Contribution to Canadian History and Iron Technology (Ottawa: Queen's Printer, 1968).
- 23 Fathi Habashi, "Chemistry and Metallurgy in New France," Chemistry in Canada (May 1975), pp. 25-27.
- 24 Léon Dufrost, "La navigation sur le Saint-Laurent, les Forges de Saint-Maurice, les Chutes de Shawinigan," Almanach trifluvien (Editions Chronique de la vallée du Saint-Maurice, 1937), pp. 59-64; N. Le Vasseur, "La construction des navires à Québec," BSGQ, Vol. 11, No. 4 (July-August 1917), pp. 187-201; Jacques Mathieu, La construction navale royale à Québec, 1739-1759 (Quebec City: La société historique de Québec, 1971).
- 25 Arthur E. Legge, The Anglican Church in Three Rivers, Quebec, 1768-1956 (n. p., n. p., 1956).
- 26 Michel Lessard and Huguette Marquis, Encyclopédie des antiquités du Québec (Montreal: Les Editions de l'Homme, 1971); Encyclopédie de la maison québécoise (Montreal: Les Editions de l'Homme, 1972).
- 27 Marcel Moussette, Le chauffage domestique en Nouvelle-France, Manuscript Report Series No. 75 (Parks Canada, April 1971).

- 28 Robert-Lionel Séguin, "Le poète en Nouvelle-France," CD, No. 33 (1968), pp. 157-170.

The Human Element

- 1 Dictionnaire biographique du Canada (DBC) (Quebec City: Presses de l'Université Laval, 1966-), Vol. 2, s.v. "François Poulin de Francheville," "Ignace Gamelin"; Vol. 3, s.v. "François-Etienne Cugnet," "Martel de Belleville," "Jacques Simonet d'Habergemont."
- 2 Ibid., Vol. 3, s.v. "Pierre Poulin."
- 3 Ibid., Vol. 2, s.v. "Louis-Frédéric Bricault de Valmur."
- 4 Ibid., Vol. 3, s.v. "Thérèse de Couagne."
- 5 Pierre-Georges Roy, La Famille Taschereau (Lévis: n. p., 1901); "Les Trésoriers de la Marine à Québec," BRH, Vol. 35, No. 10 (Oct. 1927), pp. 636-37. See also DBC, Vol. 3, s.v. "Thomas-Jacques Taschereau."
- 6 Pierre-Georges Roy, "Conseillers au Conseil souverain de la Nouvelle-France," MSRC, 3rd Series, Vol. 9 (1915), Section 1, pp. 173-188; idem, "Le Sieur Guillaume Estèbe," BRH, Vol. 52, No. 7 (July 1946), pp. 195-207.
- 7 Pierre-Georges Roy, "L'Honorable René-Ovide Hertel de Rouville," BRH, Vol. 12, No. 5 (May 1906), pp. 129-141.
- 8 DBC, Vol. 3, s.v. "Jean-Eustache Lanouillier de Boisclerc."
- 9 Ibid., s.v. "Gaspard-Joseph Chaussegros de Léry."
- 10 Ibid., s.v. "Charles de Beauharnois de la Boische."
- 11 Gérard Malchelosse, "Zachary et George-Henri Macaulay," BRH, Vol. 52, No. 9 (Sept. 1946), pp. 271-275.
- 12 A. Latt, "Un Vaudois gouverneur général du Canada, Sir Frédéric Haldimand," Revue historique vaudoise, Vol. 41, No. 4 (July-Aug. 1933), pp. 193-225.
- 13 E.Z. Massicotte, "La famille Gury," BRH, Vol. 23, No. 10 (Oct. 1917), pp. 312-14.
- 14 William Stewart Wallace, ed., The Macmillan Dictionary of Canadian Biography (Toronto: Macmillan, 1963).
- 15 Judge Fabre Surveyer and Francis-J. Audet, Les Députés de Saint-Maurice et de Buckinghamshire (1792 à 1808) (Trois-Rivières, 1934), pp. 26-34, pp. 37-40; Les Députés des Trois-Rivières (1792-1808) (Trois-Rivières: Editions du Bien Public, 1933), pp. 7-14.
- 16 Benjamin Sulte, "Sainte-Geneviève de Jacques Cartier," BRH, Vol. 4, No. 11 (Nov. 1898), pp. 345-46.
- 17 A.L. Young, The Reverend John Stuart D D V E L of Kingston, U C and his family: A Genealogical Study (Kingston: Whig Press, 1920).
- 18 Dictionnaire Biographique du Canada, Vol. 2: 1701-1740; Vol. 3: 1741-1770 (Quebec City: Presses de l'Université Laval, 1967-).
- 19 Emile Demaizière, "Les colons et émigrants bourguignons au Canada," RAPO, Vol. 4, pp. 394-399.
- 20 M. Gaucher, M. Delafosse and G. Debien, "Les engagés pour le Canada au XVIII^e siècle," RHAF, Vol. 13, No. 2 (Sept. 1959), pp. 247-61; No. 3 (Dec. 1959), pp. 402-21; No. 4 (March 1960), pp. 550-61; Vol. 14, No. 1 (June 1960), pp. 87-108; No. 2 (Sept. 1960), pp. 246-58; No. 3 (Dec. 1960), pp. 430-40; No. 4 (March 1961), pp. 583-602.

- 21 Napoléon Caron, *op. cit.*
- 22 J.-E. Bellemare, *op. cit.*
- 23 Father Odorick-Marie Jouve, *O F M, Les Franciscains et le Canada*, (Paris: Procure des missions franciscaines, 1934).
- 24 Napoléon Caron, *op. cit.*
- 25 Thomas Boucher, *op. cit.*
- 26 Dollard Dubé et al., *Contes et Légendes des Vieilles Forges* (Trois-Rivières: Editions du Bien Public, 1954). See also "Les légendes des Forges," *Almanach trifluvien*, (n. p.: Editions Chronique de la vallée du Saint-Maurice, 1937).
- 27 This was made out of a mass of cast iron fixed to the end of a wooden beam. The beam was mounted between two vertical posts by means of pivots which allowed it to swing. It was driven by a horizontal camshaft propelled by a waterwheel which was turned by means of a stream of water.
- 28 Moissette Olier, *Etincelles* (Trois-Rivières: Le Nouvelliste, 1936).

Part III The Iron Industry: A Comparative Study

Iron Industry in France

- 1 Jacques Levainville, *L'industrie du fer en France* (Paris: Armand Colin, 1922).
- 2 A low-shaft furnace equipped with *tuyères*, in which iron is manufactured directly from ore without being melted.
- 3 Forge hearths which can be transported on a wagon.
- 4 Refining is the primary treatment to which pig iron is subjected so as to remove its impurities, consolidate the iron and prepare it for the forging process. The buildings containing the large forges used for this purpose are referred to as "refineries."
- 5 Bertrand Gille, *Les origines de la grande industrie du fer en France* (Paris: Editions Domat Montchrestien, 1947).
- 6 Machines with two cylinders turning in opposite directions which roll the metal into sheets or bars. This process is called "lamination."

Iron Industry in Great Britain

- 1 Thomas Ashton, *The Industrial Revolution, 1760-1830* (Reprint. and rev. ed.; New York: Oxford University Press, 1964).
- 2 Thomas Ashton, *Iron and Steel in the Industrial Revolution* (Manchester: The University Press, 1924).
- 3 The former process whereby molten pig-iron was converted by subjecting it to stirring in the presence of oxidizing substances which freed it of most of its carbon and other impurities.
- 4 Arthur Raistrick, *Dynasty of Iron Founders: The Darbys and Coalbrookdale* (Newton Abbot: David & Charles, 1970).
- 5 Barrie Trinder, *The Darbys of Coalbrookdale* (Chichester, Sussex: Phillimore & Co. Ltd., 1974).
- 6 This type of furnace was first tested in England in the 18th century. It involved no direct contact between the iron and the charcoal, which was usually used to fire the furnace.
- 7 D. Morgan Rees, *Mines, Mills and Furnaces* (London: Her Majesty's Stationery Office, 1969).

Iron industry in the United States

- 1 Arthur Cecil Bining, Pennsylvania Iron Manufacture in the Eighteenth Century (2nd. ed.; Harrisburg, Pa.: Pennsylvania Historical and Museum Commission, 1973).
- 2 A type of furnace invented in Germany at the beginning of the 18th century. Considered as an intermediary stage between the Catalan forge and the modern blast furnace, mainly because of its larger dimensions, it made it possible to extract the forgeable iron directly from the ore.
- 3 E.N. Hartley, Ironworks on the Saugus (Norman: University of Oklahoma Press, 1957).
- 4 A second hearth, located beside the refinery. It was used for the sole purpose of reheating the iron during the hammering process while it was being refined.
- 5 Joseph E. Walker, Hopewell Village: The Dynamics of a Nineteenth Century Iron-Making Community (3rd. printing; Philadelphia: University of Pennsylvania Press, 1974).
- 6 Large triangular bars of furnace iron, before it has been treated in any way. Pig iron is impure, brittle and cannot be forged.
- 7 James D. Norris, Frontier Iron: The Maramec Iron Works, 1826-1876 (Madison: The State Historical Society of Wisconsin, 1964).
- 8 A thick metal pipe in the shape of a funnel whose narrow end is set inside the blast furnace or forge and through which air is forced by means of a bellows.
- 9 Kathleen Bruce, Virginia Iron Manufacture in the Slave Era (Reprint of 1931 edition; New York: Augustus M. Kelley, 1968).
- 10 Charles B. Dew, "David Ross and the Oxford Iron Works: a Study of Industrial Slavery in the Early Nineteenth-Century South," The William and Mary Quarterly, Third Series, Vol. 31, No. 2 (April 1974), pp. 189-224.

BIBLIOGRAPHY

- Allaire, J.B.A. 1916. Dictionnaire biographique du clergé canadien-français. Imprimerie de l'Ecole catholique des sourds-muets, Montreal.
- Almanac trifluvien. 1937. "Les légendes des Forges." Editions Chronique de la vallée du Saint-Maurice, n.p.
- American Catholic Historic Researches. 1907. "Pelissier, Director of the Iron works at Three Rivers, Canada, to the Continental congress, advising measures for the Capture of Quebec and telling that some of the priests had prayed that God would exterminate the American troops coming to Canada." (April), pp. 144-49, Pittsburgh.
- Ashton, Thomas. 1924. Iron and Steel in the Industrial Revolution. The University Press, Manchester.
- . 1964. The Industrial Revolution, 1760-1830. Reprinted and revised edition. Oxford University Press, New York.
- Bartlett, James H. 1885. The Manufacture, Consumption and Production of Iron, Steel, and Coal in the Dominion of Canada, with some Notes on the Manufacture of Iron, and on the Iron Trade in other Countries. Dawson Brothers, Montreal.
- Bédard, Avila. 1958. "Forestry in Quebec, Past, Present, Future." Canadian Geographical Journal, Vol. 57, No. 2 (August), pp. 36-49, Ottawa.
- Béland, Jacques. 1961. Rapport géologique 97: Région de Shawinigan, Comtés de Saint-Maurice, Champlain et Laviolette. Department of Natural Resources, Quebec City.
- Bellemare, J.-E. 1918. "Les Vieilles Forges Saint-Maurice et les Forges Radnor." Bulletin des recherches historiques, Vol. 24, No. 9 (September), pp. 257-69, Lévis.
- Bernard, Matthieu A. 1900. "L'esclavage au Canada." Bulletin des recherches historiques, Vol. 6, No. 4 (April), pp. 119-21, Lévis.
- Bibaud, Michel. 1825-26. La bibliothèque canadienne, Vol. 2, Imprimerie J. Lane, Montreal.
- Bining, Arthur Cecil. 1933. British Regulations of the Colonial Iron Industry. University of Pennsylvania Press, Philadelphia.

- . 1973. *Pennsylvania Iron Manufacture in the Eighteenth Century*. 2nd. ed., Pennsylvania Historical and Museum Commission, Harrisburg, Pa.
- Biron, Hervé. 1962. "Les Forges Saint-Maurice." *Perspectives*, No. 13 (March 31), pp. 10-31, Montreal.
- Blanchard, Raoul. 1947. *Le Centre du Canada français*. Librairie Beauchemin Limitée, Montreal.
- . 1950. *La Mauricie*. Collection l'Histoire Régionale, No. 3. Editions du Bien Public, Trois-Rivières.
- Boucher, Thomas. 1952. *Mauricie d'autrefois*. Collection L'Histoire Régionale, No. 11. Editions du Bien Public, Trois-Rivières.
- Boyer, Raymond. 1966. *Les crimes et les châtements au Canada français du XVII^e au XX^e siècle*. Le Cercle du Livre de France, Montreal.
- Breton, P.E. 1937. *Cap-de-la-Madeleine: Cité Mystique de Marie*. N. p.: n. p.
- Brouillette, Benoît. 1932. *Le développement industriel de la vallée du Saint-Maurice*. Collection Pages trifluviennes, Series A, No. 2. Editions du Bien Public, Trois-Rivières.
- Brown, J.J. 1967. *Ideas in Exile*. McClelland and Stewart, Toronto.
- Bruce, Kathleen. 1968. *Virginia Iron Manufacture in the Slave Era*. Reprint of 1931 ed. Augustus M. Kelley, New York.
- Bulletin de la Société de Géographie de Québec. 1915. "Les loyalistes à Machiche." Vol. 9, No. 3 (May-June), pp. 180-81, Quebec City.
- Bulletin des recherches historiques. 1934. "La famille Chaussegros de Léry." Vol. 40, No. 10 (October), pp. 577-614, Lévis.
- . 1934. "La famille Martel de Magesse." Vol. 40, No. 12 (December), 705-29, Lévis.
- Canada. Department of Agriculture. 1887. *La vallée du Saint-Maurice: informations pour les colons*. Ottawa.
- Caron, Ivanhoe. "Inventaire de la correspondance de Mgr Jean-François Hubert et Charles-François Bailly de Messein." *Rapport de l'Archiviste de la province de Québec pour 1930-31*, Vol. 11, pp. 199-301.
- . 1925. "Le chemin de la rive nord du Saint-Laurent: Québec-Montréal." *Bulletin des recherches historiques*, Vol. 31, No. 1 (January), pp. 286-90, Lévis.
- Caron, Napoléon. ca. 1889. *Deux voyages sur le Saint-Maurice*. P.V. Ayotte, publisher and bookseller, Trois-Rivières.
- . 1900. "Les Gugs au Canada." *Bulletin des recherches historiques*, Vol. 6, No. 3 (March), pp. 89-91, Lévis.

- Carufel, D.O.S. De. 1907. Notes sur la paroisse de Notre-Dame du Mont-Carmel, comté de Champlain, P.Q. Ed. S. De Carufel, Trois-Rivières.
- Chapais, Thomas. 1904. Jean Talon, intendant de la Nouvelle-France (1665-1672). S.- A. Demers, Quebec City.
- La Cité des Trois-Rivières, P.Q., Canada. 1910. N. p.: n. p.
- Clibbon, Peter B. 1964. "Utilisation du sol et colonisation de la région des Laurentides centrales." *Geographical Bulletin*, No. 21, pp. 5-20, Ottawa.
- Clibbon, Peter B. and Jacques Gagnon. 1966. "L'évolution récente de l'utilisation du sol sur la rive nord du Saint-Laurent entre Québec et Montréal." *Cahiers de Géographie de Québec*, Vol. 10, No. 19 (April), pp. 55-60, Quebec City.
- Cloutier, Prosper. 1915. Histoire de la paroisse de Champlain. 2 vols. Imprimerie Le Bien Public, Trois-Rivières.
- Creighton, Donald G. 1956. *The Empire of the St. Lawrence*. Macmillan of Canada, Toronto.
- Dalton, Roy C. 1968. *The Jesuits' Estates Question 1760-1888*. University of Toronto Press, Toronto.
- Debien, G. 1952. "Engagés pour le Canada au XVII^e siècle vus de La Rochelle." *Revue d'Histoire de l'Amérique Française*, Vol. 6, No. 2 (September), pp. 177-233, Montreal.
- Demaizière, Emile. "Les colons et émigrants bourguignons au Canada." *Rapport de l'Archiviste de la province de Québec pour 1923-1924*, Vol. 4, pp. 394-99, Quebec City.
- Denison, Merrill. 1955. *The Barley and Stream*. McClelland and Stewart, Toronto.
- . 1965. *Canada's First Bank: A History of the Bank of Montreal*. McClelland and Stewart, Toronto.
- Desaulniers, F.- L. 1899. "Les députés de Saint-Maurice." *Bulletin des recherches historiques*, Vol. 5, No. 9 (September), pp. 283-85, Lévis.
- Désilets, Auguste. 1933. *La Grand'Mère*. Collection Pages trifluviennes, Series A, No. 10. Editions du Bien Public, Trois-Rivières.
- Dew, Charles B. 1974. "David Ross and the Oxford Iron Works: A Study of Industrial Slavery in the Early Nineteenth-Century South." *The William and Mary Quarterly*, Third Series, Vol. 31, No. 2 (April), pp. 189-224, Williamsburg.
- Dictionary of National Biography. 1921-. University of London, London, 22 vols.

- Dictionnaire Biographique du Canada. 1966- . Presses de l'Université Laval, Quebec City.
- Donald, William J. 1915. *The Canadian Iron and Steel Industry*. Houghton Mifflin, Boston.
- Douville, Raymond and Casanova, J.D. 1964. *La vie quotidienne en Nouvelle-France: Le Canada, de Champlain à Montcalm*. Hachette, Paris.
- Drapeau, Stanislas. 1863. *Etudes sur les développements de la colonisation du Bas-Canada depuis dix ans (1851-1861)*. Brousseau - Léger Typ, Quebec City.
- . 1887. *Canada: Le guide du colon français, belge, suisse*. N. p. Ottawa.
- Dresser, S.A. and Denis, T.C. 1951- . *La géologie du Québec*. R. Paradis, King's Printer, Quebec City.
- Dubé, Dollard et al. 1933. *Les Vieilles Forges il y a 60 ans*. Collection Pages trifluviennes, Series A, No. 4. Editions du Bien Public, Trois-Rivières.
- . 1954. *Contes et Légendes des Vieilles Forges*. Collection L'Histoire Régionale, No. 16. Editions du Bien Public, Trois-Rivières.
- Dufrost, Léon. 1937. "La navigation sur le Saint-Laurent, les Forges de Saint Maurice, les chutes de Shawinigan." *Almanack trifluvien*, Editions Chronique de la vallée du Saint-Maurice, pp. 59-64.
- Dugré, Alexandre. 1934. *La Pointe-du-Lac*. Collection Pages trifluviennes, Series A, No. 15. Editions du Bien Public, Trois-Rivières.
- Dulieux, E. "Preliminary Report on some iron ore deposits in the Province of Quebec." *Quebec Report of Mining Operations*, 1909-1912.
- Dupin, Pierre. 1935. *Anciens chantiers du Saint-Maurice*. Collection Pages trifluviennes, Series B, No. 7. Editions du Bien Public, Trois-Rivières.
- Dusablon, L.A. 1907. "Pelissier, The Foundry Man of Three Rivers, Canada: Maker of Ammunition for the Americans Attacking Quebec." *The American Catholic Historical Researches*, Vol. 3, No. 3 (July), pp. 193-96, Parkesburg, Pa.
- Eccles, W.J. 1961. "The History of New France according to Francis Parkman." *William and Mary Quarterly*, 3rd. Series, Vol. 18, No. 3 (April), pp. 163-75, Williamsburg.
- Fauteux, Joseph-Noël. 1927. *Essai sur l'Industrie au Canada sous le Régime français*. 2 vols. Ls-A. Proulx, Quebec City.

- Ferland, J.B.A. 1861-65. Cours d'Histoire du Canada. 2 vols. Augustin Côté, Quebec City.
- Filion, Maurice. 1972. La pensée et l'action coloniales du Maurepas vis-à-vis du Canada 1723-1749. Léméac, Montreal.
- Filteau, Gérard. 1937. La naissance d'une nation: tableau du Canada en 1755. 2 vols. Editions de l'A.C.F., Montreal.
- Fréchette, Louis. 1974. Contes I - La Noël au Canada. Fides, Montreal.
- Frégault, Guy. 1944. La civilisation de la Nouvelle-France, 1713-1744. Société des Editions Pascal, Montreal.
- Gadd, N.-R. 1960. Géologie de la région de Bécancour, Québec (dépôts meubles). Geological Survey of Canada, Ottawa.
- Gaucher, M., M. Delafosse and G. Debien. "Les engagés pour le Canada au XVIII^e siècle." *Revue d'Histoire de l'Amérique française*, Vol. 13, No. 2 (September 1959), pp. 247-61; No. 3 (December 1959), pp. 402-21; No. 4 (March 1960), pp. 550-61; Vol. 14, No. 1 (June 1960), pp. 87-108; No. 2 (September 1960), pp. 246-58; No. 3 (December 1960), pp. 430-40; No. 4 (March 1961), pp. 583-602, Montreal.
- Gaumont, Michel. 1958. "Les forges du Saint-Maurice." *Vie des Arts*, No. 50 (Spring), pp. 46-51, Montreal.
- . 1968. Les Forges du Saint-Maurice. Société historique de Québec, Quebec City.
- Gille, Bertrand. 1947. Les origines de la grande industrie métallurgique en France. Editions Domat Montchrestien, Paris.
- Godbout, Gérard. 1967. Etude pédologique des comtés de Champlain et de Lavolette. Department of Agriculture and Colonization, Quebec City.
- Grant, George M., ed. 1882. Picturesque Canada: The Country As It Was and Is. Belden Brothers, Toronto.
- Greening, W.E. 1959. "Trois-Rivières - Historic gateway to the St. Maurice." *Canadian Geographical Journal*, Vol. 49, No. 6 (December), pp. 204-11, Ottawa.
- Habashi, Fathi. 1975. "Chemistry and metallurgy in New France." *Chemistry in Canada* (May), pp. 25-27, Ottawa.
- Hamelin, E. 1933. La paroisse de Champlain. Collection Pages trifluviennes, Series A, No. 7. Editions du Bien Public, Trois-Rivières.
- Hamelin, Jean. 1960. Economie et Société en Nouvelle-France. Presses Universitaires Laval, Quebec City.

- Harper, J. Russel. 1970. *Early Painters and Engravers in Canada*. University of Toronto Press, Toronto.
- Hartley, E.N. 1957. *Ironworks on the Saugus*. University of Oklahoma Press, Norman.
- Iron and Steel of Canada. 1932. "The Forges of the St. Maurice." Vol. 15, No. 11 (November), pp. 133-36, Gardenvale, Quebec.
- . 1934. "The Story of Radnor Forges." Vol. 17, No. 2 (March-April), pp. 24-27, Gardenvale, Quebec.
- Irving, Sidney L. 1934. *An Adventure of Iron Men in a World of Iron: The Romance of the Saint-Maurice Forges*. Académie DLS, Trois-Rivières.
- Jouve, Odoric-Marie, 1934. *Les Franciscains et le Canada, aux Trois-Rivières*. Procure des missions franciscaines, Paris.
- Killikelly, Desmond. 1938. "The Steel Industry of Canada." *Canadian Geographical Journal*, Vol. 16, No. 5 (May), pp. 213-46, Ottawa.
- Landry, Armour. 1932. *Bribes d'histoire*. Collection Pages trifluviennes, Series A, No. 1. Editions du Bien Public, Trois-Rivières.
- Latt, A. 1933. "Un Vaudois gouverneur général du Canada, Sir Frédéric Haldimand." *Revue historique vaudoise*, Vol. 41, No. 4 (July-August), pp. 193-225.
- Lee, David. "A Short History of the St. Maurice Forges." *Miscellaneous Reports on Sites in Quebec*, Parks Canada. Manuscript Report No. 132, pp. 97-120, Ottawa.
- Legge, Arthur E. 1956. *The Anglican Church in Three Rivers, Quebec, 1768-1956*. N. p.: n. p.
- Le Goff, Jacques and Pierre Nora. 1974. *Faire de l'Histoire*. 3 vols. Gallimard, Paris.
- Lejeune, R.P.L. 1931. *Dictionnaire général de biographie, histoire, littérature, agriculture, commerce et industrie ... du Canada*. University of Ottawa, Ottawa.
- Leroy-Ladurie, Emmanuel. ca. 1967. *Histoire du climat depuis l'an mil*. Flammarion, Paris.
- . 1973. *Le territoire de l'historien*. Gallimard, Paris.
- . 1974. "L'Histoire immobile." *Annales Economie Sociétés Civilisations*, Vol. 29, No. 3 (May-June), pp. 673-92, Paris.
- Lessard, M. and H. Marquis. 1971. *Encyclopédie des antiquités du Québec*. Les Editions de l'Homme, Montreal.
- . 1972. *Encyclopédie de la maison québécoise*. Les Editions de l'Homme, Montreal.

- Levainville, Jacques. 1922. *L'industrie du fer en France*. Armand Colin, Paris.
- Le Vasseur, N. 1911. "Mines de marais et les anciennes forges Radnor." *Bulletin de la Société de Géographie de Québec*, Vol. 5, No. 3 (May-June), pp. 185-92, Quebec City.
- . 1917. "La construction des navires à Québec." *Bulletin de la Société de Géographie de Québec*, Vol. 11, No. 4 (July-August), pp. 187-201, Quebec City.
- Macaulay, Geo. H. "The Iron Mines of the St. Maurice Territory: Their Discovery, the Progress of Their Development and Their Present Condition." *British Canadian Review*, Vol. 1, No. 2 (January 1863), pp. 43-52; No. 3 (February 1863), pp. 95-103, Quebec City.
- McDougall, David J. 1971. "The Final Half-Century of Charcoal Iron Production in Quebec - 1861 to 1911." *Canadian Mining Journal* (August), pp. 1-4, Don Mills, Ontario.
- McGuire, B.J. 1950. "A river in harness." *Canadian Geographic Journal*, Vol. 30, No. 5 (May), pp. 210-31, Ottawa.
- Magnan, Hormisdas. 1925. *Dictionnaire historique et géographique des paroisses, missions et municipalités de la province de Québec*. L'Imprimerie d'Arthabaska Inc., Arthabaska.
- Malchelosse, Gérard. 1946. "Zachary et Georges-Henry Macaulay." *Bulletin des recherches historiques*, Vol. 52, No. 9 (September), pp. 271-75, Lévis.
- . 1964. "La famille Pommereau et ses alliances." *Les Cahiers des Dix*, No. 29, pp. 193-222, Montreal.
- Mandrou, Robert. 1973. *Louis XIV et son temps 1661-1715*. Collection "Peuples et Civilisations." Presses Universitaires de France, Paris.
- Massicotte, E.Z. 1916. "L'usage des poêles sous le régime français." *Bulletin des recherches historiques*, Vol. 22, No. 11 (November), pp. 334-35, Lévis.
- . 1917. "La famille Gagy." *Bulletin des recherches historiques*, Vol. 23, No. 10 (October), pp. 312-14, Lévis.
- . 1929a. "Batiscan." *Bulletin des recherches historiques*, Vol. 35, No. 1 (January), pp. 6-10, Lévis.
- . 1929b. "Historique de la paroisse de Saint-Maurice, Comté de Champlain." *Bulletin des recherches historiques*, Vol. 35, No. 5 (May), pp. 292-304; No. 6 (June), pp. 336-47, Lévis.
- . 1929c. "Notes diverses sur le Cap-de-la-Madeleine." *Bulletin des recherches historiques*, Vol. 35, No. 7 (July), pp. 389-97, Lévis.
- . 1935. "Les forges de Sainte-Geneviève de Batiscan." *Bulletin des recherches historiques*, Vol. 41, No. 9 (September), pp. 564-67; No. 10 (October), pp. 708-11, Lévis.
- . 1936. *Sainte-Geneviève de Batiscan*. Collection Pages trifluviennes, Series A, No. 18. Editions du Bien Public, Trois-Rivières.

- Mathieu, Jacques. 1971. La construction navale royale à Québec 1739-1759. Cahiers d'Histoire, No. 23. La Société historique de Québec, Quebec City.
- Miller, Harry. 1968. Canada's Historic First Iron Castings: A Contribution to Canadian History and Iron Technology. Queen's Printer, Ottawa.
- Morgan, Henry J. 1862. Sketches of Celebrated Canadians and Persons Connected with Canada, from the Earliest Period in the History of the Province Down to the Present Time. Hunter, Rose & Co., Quebec City.
- Moussette, Marcel. 1971. Le chauffage domestique en Nouvelle-France. Manuscript Report Series No. 75. Parks Canada, Ottawa.
- Nish, Cameron. "La banqueroute de François-Etienne Cugnet." *Actualité économique*, Vol. 41, No. 1 (April-June 1965), pp. 149-202; No. 2 (July-September 1965), pp. 347-78; No. 4 (January-March 1966), pp. 762-810; Vol. 42, No. 1 (April-June 1966), pp. 161-208; No. 2 (July-September 1966), pp. 391-422; No. 3 (October-December 1966), pp. 704-27, Montreal.
- . 1967. "François-Etienne Cugnet et les Forges de Saint-Maurice: un type d'entrepreneur et d'entreprise en Nouvelle-France." *Actualité économique*, Vol. 42, No. 4 (January-March), pp. 884-97, Montreal.
- . 1975. François-Etienne Cugnet: Entrepreneur et entreprises en Nouvelle-France. Fides, Montreal.
- Norris, James D. 1964. Frontier Iron: The Maramec Iron Works, 1826-1876. The State Historical Society of Wisconsin, Madison.
- Obalski, Joseph. 1900. Industries minérales de la province de Québec, Canada. N. p: n. p.
- Olier, Moissette. 1932. Au pays de l'énergie. Collection Pages trifluviennes, Series B, No. 3. Editions du Bien Public, Trois-Rivières.
- . 1936. Etincelles. Le Nouvelliste, Trois-Rivières.
- Pageau, Ernest. 1967. Etude pédologique des comtés de Trois-Rivières et de Saint-Maurice. Department of Agriculture and Colonization, Quebec City.
- Pentland, H.C. 1959. "The development of a capitalistic labour market in Canada." *Canadian Journal of Economics and Political Science*, Vol. 25, No. 4 (November), pp. 450-61, Toronto.
- Pratte, Marcel. ca. 1959. Un siècle d'Histoire (Saint-Etienne-des-Grès). N. p., n. p.
- Radnor, 60 ans de progrès, 1894-1954. 1954. Les Breuvages Radnor, N. p.
- Raistrick, Arthur. 1970. Dynasty of Iron Founders: The Darbys and Coalbrookdale. David & Charles, Newton Abbot.

- Recherches Sociographiques. 1974. "L'historiographie." Vol. 15, No. 1 (January-April), pp. 9-112, Quebec City.
- Rees, D. Morgan. 1969. *Mines, Mills and Furnaces: An Introduction to Industrial Archeology in Wales*. Her Majesty's Stationery Office, London.
- Renaud, Paul-Emile. 1928. *Les origines économiques du Canada: l'oeuvre de la France*. Gabriel Enault, Mamers.
- Rowe, R.C. 1934. "The St. Maurice Forges." *Canadian Geographical Journal*, Vol. 9, No. 1 (July), pp. 14-22, Ottawa.
- Roy, Antoine. "Recensement des habitants de la ville et du gouvernement des Trois-Rivières." *Rapport de l'archiviste de la province de Québec pour 1946-1947*, pp. 3-53, Quebec City.
- Roy, Pierre-Georges. 1901. *La famille Taschereau*. N. p., Lévis.
- . 1906a. "Les trois frères Lanoullier." *Bulletin des recherches historiques*, Vol. 12, No. 1 (January), pp. 15-21, Lévis.
- . 1906b. "L'Honorable René-Ovide Hertel de Rouville." *Bulletin des recherches historiques*, Vol. 12, No. 5 (May), pp. 129-41, Lévis.
- . 1915. "Conseillers au conseil souverain de la Nouvelle-France." *Mémoires de la Société royale du Canada*, 3rd. Series, Vol. 9, Section 1, pp. 173-88.
- . 1928. *Les petites choses de notre histoire*. N. p., Lévis.
- . 1929. "Les trésoriers de la Marine à Québec." *Bulletin des recherches historiques*, Vol. 35, No. 10 (October), pp. 636-37, Lévis.
- . 1941. "L'inventaire d'un seigneur canadien." *Bulletin des recherches historiques*, Vol. 47, No. 11 (November), pp. 321-23.
- . 1946. "Le Sieur Guillaume Estèbe." *Bulletin des recherches historiques*, Vol. 52, No. 7 (July), pp. 195-207, Lévis.
- Séguin, Pierre-Lionel. 1968. "Le poêle en Nouvelle-France." *Les Cahiers des Dix*, No. 33, pp. 157-70, Montreal.
- Sharp, Myron B. and William H. Thomas. 1966. *A Guide to the Old Stone Blast Furnace in Western Pennsylvania*. The Historical Society of Western Pennsylvania, Pittsburgh.
- Smiles, Samuel. 1968. *Industrial Biography: Iron Workers and Tool Makers*. Reprint of 1863 ed. Kelley, New York.
- Sulte, Benjamin. 1879. *Chronique trifluvienne*. Compagnie d'Imprimerie canadienne, Montreal.
- . 1898. "Sainte Geneviève de Jacques Cartier." *Bulletin des recherches historique*, Vol. 4, No. 11 (November).
- . 1911. "Le Bas Saint-Maurice." *Bulletin de la Société de Géographie de Québec*, Vol. 5, No. 1 (January-February), pp. 37-39, Quebec City.
- . 1916. "Le petit poisson." *Bulletin de la Société de Géographie de Québec*, Vol. 10, No. 2 (March-April), pp. 67-73, Quebec City.
- . 1920. *Les Forges Saint-Maurice*. *Mélanges historiques*, Vol. 6. G. Ducharme, Montreal.

- Surveyer, Fabre and Francis-J. Audet. 1933. *Les Députés des Trois-Rivières (1792 à 1808)*. Collection Pages trifluviennes, Series A, No. 9. Editions du Bien Public, Trois-Rivières.
- . 1934. *Les Députés de Saint-Maurice et de Buckinghamshire (1792 à 1808)*. Collections Pages trifluviennes, Series A, No. 9A. Editions du Bien Public, Trois-Rivières.
- Swank, James M. 1964. *History of the Manufacture of Iron in All Ages and Particularly in the United States from Colonial Times to 1891*. Reprint of 1892 edition. Franklin, New York.
- Tessier, Albert. 1937. "Une campagne antitrustarde il y a un siècle." *Les Cahiers des Dix*, No. 2, pp. 199-206, Montreal.
- . 1939. "De Jacques Buteux à l'arpenteur Bouchette." *Les Cahiers des Dix*, No. 4, pp. 223-42, Montreal.
- . 1940. "Encore le Saint-Maurice." *Les Cahiers des Dix*, No. 5, pp. 145-75, Montreal.
- . 1945. "Aux sources de l'industrie américaine: Les Vieilles Forges." *Les Cahiers Reflets*, Vol. 1, No. 3 (January), pp. 5-35, Trois-Rivières.
- . 1946. "Minéraux de basse étoffe." *Les Cahiers des Dix*, No. 11, pp. 119-40, Montreal.
- . 1947. "Débuts pénibles de l'industrie lourde au Canada." *Les Cahiers de Dix*, No. 12, pp. 53-73, Montreal.
- . 1948. "Le roi s'en mêle." *Les Cahiers des Dix*, No. 13, pp. 63-83, Montreal.
- . 1949. "Les Anglais prennent les Forges au sérieux." *Les Cahiers des Dix*, No. 14, pp. 165-85, Montreal.
- . 1950. "Les trifluviens s'échauffent... Le dernier demi-siècle des Forges (1833-1883)." *Les Cahiers des Dix*, No. 15, pp. 163-83, Montreal.
- . 1952a. *Les Forges Saint-Maurice 1729-1883*. Collection L'Histoire Régionale, No. 10. Editions du Bien Public, Trois-Rivières.
- . 1952b. "Trois-Rivières, 1884." *Les Cahiers des Dix*, No. 17, pp. 153-68, Montreal.
- . 1953. "La cité trifluviennne vue par M. Smith et Miss Fenton (1892-1894)." *Les Cahiers des Dix*, No. 18, pp. 113-27, Montreal.
- . 1967. "Trois-Rivières." *Habitat*, Vol. 10, No. 3-6, pp. 42-45, Ottawa.
- . *Cahiers de Dix*, No. 12, pp. 53-73, Montreal.
- Thériault, Yvon. "Inventaire sommaire des archives du Séminaire des Trois-Rivières." *Rapport de l'archiviste de la province de Québec pour 1961-1964*, Vol. 42, pp. 71-134, Quebec City.
- . 1954. *Trois-Rivières ville de reflet*. Collection L'Histoire Régionale, No. 15. Editions du Bien Public, Trois-Rivières.
- . 1958. *Trois-Rivières incorporée 1857-1957*. N. p.: n. p.
- Thomas, Earl A. 1949. "Hopewell Iron Plantation." *The Highway Magazine* (August), 171-76, Middletown, Ohio.
- To Commemorate the Visit of the Members of the International Mining Convention of 1893 to Radnor Forges. February 25, 1893, n.p.

- Townsley, B.F. 1935. *Mine finders: The History and Romance of Canadian Mineral Discoveries*. Saturday Night Press, Toronto.
- Traquair, Ramsay. 1930. No. 92 St. Peter Street, Quebec: A Quebec Merchant's House of the XVIIIth Century. Series XIII (Art and Architecture) No. 27. McGill University Publications, Montreal.
- Trinder, Barrie. 1974. *The Darbys of Coalbrookdale*. Phillimore & Co. Ltd., Chichester, Sussex.
- Trois-Rivières Chamber of Commerce. 1963. *Projet de reconstruction "Les Forges Saint-Maurice, 1729-1883"*. Trois-Rivières.
- Trois-Rivières: A Guide to the City of Lavolette, the Second Oldest Settlement in Canada, Whose Romantic History is Full of Interest for the Visitor. ca. 1925.
- Trudel, Marcel. 1951a. "Le gouvernement des Trois-Rivières sous le Régime militaire (1760-1764)." *Revue d'Histoire de l'Amérique française*, Vol. 5, No. 1 (June), pp. 69-98, Montreal.
- . 1951b. "Les Forges Saint-Maurice sous le Régime militaire (1760-1764)." *Revue d'Histoire de l'Amérique française*, Vol. 5, No. 2, (September), pp. 159-85, Montreal.
- . 1952. *Le Régime militaire dans le Gouvernement des Trois-Rivières, 1760-1764*. Collection L'Histoire Régionale, No. 8. Editions du Bien Public, Trois-Rivières.
- Les Ursulines des Trois-Rivières depuis leur établissement jusqu'à nos jours. 1888-98. P.V. Ayotte, Trois-Rivières, 3 vols.
- Valoisville, Valois de. 1909. "Les forges de Saint-Maurice." *Bulletin des recherches historiques*, Vol. 15, No. 10 (October), pp. 318-19, Lévis.
- Walker, Joseph E. 1974. *Hopewell Village: The Dynamics of a Nineteenth Century Iron-Making Community*. University of Pennsylvania Press, Philadelphia.
- Wallace, William Stewart, ed. 1963. *The Macmillan Dictionary of Canadian Biography*. 3rd. ed., rev. Macmillan, Toronto.
- Wurtele, Fred C. 1887. "Historical Record of the St. Maurice Forges, The Oldest Active Blast-Furnace on the Continent of America." *Proceedings and Transactions of the Royal Society of Canada for the year 1886*, Vol. 4 (1887), Section II, pp. 77-90, Montreal.
- Young, A.L. 1920. *The Reverend John Stuart DWEL of Kingston, UC and his Family: A Genealogical Study*. Whig Press, Kingston.

HISTORY AND ARCHAEOLOGY/HISTOIRE ET ARCHEOLOGIE

Publications available in Canada through authorized bookstore agents and other bookstores, or by mail from the Canadian Government Publishing Centre, Supply and Services Canada, Hull, Quebec, Canada K1A 0S9.

- 1 Geneviève G. Bastien, Doris D. Dubé and Christina Southam, *Inventaire des marchés de construction des archives civiles de Québec, 1800-1870* (1975; 3 vols.; \$20.00 a set, \$24.00 outside Canada. Technical reference work available in French in the Histoire et archéologie series.)
- 2 Réal Bélanger, *Social and Economic History of St-Lin, 1805-83, and the Importance of the Laurier Family* (1980; \$4.00, \$4.80 outside Canada)
- 3 Yvon Desloges, *Structural History of Fort George* (1980; \$5.00, \$6.00 outside Canada)
- 4 André Giroux, Nicole Cloutier and Rodrigue Bédard, *Plans de l'architecture domestique inventoriés aux Archives Nationales du Québec à Montréal; Plans de l'architecture commerciale et industrielle inventoriés aux Archives Nationales du Québec à Montréal; Plans de l'architecture publique, de l'architecture religieuse et du génie mécanique inventoriés aux Archives Nationales du Québec à Montréal* (1975; 3 vols.; \$11.00 a set, \$13.20 outside Canada. Technical reference work available in French in the Histoire et archéologie series.)
- 5 E.Y. Arima, *A Report on a West Coast Whaling Canoe Reconstructed at Port Renfrew, B.C.* (1975; \$5.50, \$6.50 outside Canada)
- 6 Olive Patricia Dickason, *Louisbourg and the Indians: A Study in Imperial Race Relations, 1713-1760*
Linda M. Hoad, *Surgeons and Surgery in Ile Royale* (1976; out of print)
- 7 Norman F. and Anne Barka, *Archaeology and the Fur Trade: The Excavation of Sturgeon Fort, Saskatchewan* (1976; \$6.25, \$7.50 outside Canada)
- 8 David Flemming, *Navy Hall, Niagara-on-the-Lake*
David Lee, *Fort Wellington: A Structural History*
David Lee, *The Battle of the Windmill: November 1838* (1976; \$5.75, \$6.90 outside Canada)
- 9 John P. Wilson and Linda Southwood, *Fort George on the Niagara: An Archaeological Perspective* (1976; \$8.00, \$9.60 outside Canada)

- 10 **Réal Boissonnault, Jacques Cartier: His Life and Exploits (1491-1557)**
Kenneth E. Kidd, Excavations at Cartier-Brébeuf Park, Quebec City, 1959
John H. Rick, Excavations at Cartier-Brébeuf Park, Quebec City, 1962
Marcel Moussette, Salvage Excavations at Cartier-Brébeuf Park, Quebec City, 1969
 (1980; \$9.00, \$10.80 outside Canada)

- 11 **Iain C. Walker, Clay Tobacco-Pipes, with Particular Reference to the Bristol Industry**
 (1977; 4 vols.; \$25.00 a set, \$30.00 outside Canada)

- 12 **Richard Lueger, Prehistoric Occupations at Coteau-du-Lac, Quebec: A Mixed Assemblage of Archaic and Woodland Artifacts**
A. Couture and J.O. Edwards, Analyses of Two Prehistoric Copper Artifacts from the Cloverleaf Bastion of the Fort at Coteau-du-Lac, Quebec
D.E. Lawrence, Identification of Representative Prehistoric Stone Artifacts and Samples of Unworked Stone from the Cloverleaf Bastion of the Fort at Coteau-du-Lac, Quebec
W.B. Scott, Fish Remains from the Cloverleaf Bastion of the Fort at Coteau-du-Lac, Quebec
J. Edson Way, The Human Osteological Material from the Cloverleaf Bastion of the Fort at Coteau-du-Lac, Quebec
 (1977; \$8.00, \$9.60 outside Canada)

- 13 **Margaret Coleman, The American Capture of Fort George, Ontario**
Elizabeth Vincent, The Guardhouse at Fort George, Ontario
 (1977; out of print)

- 14 **J.N. Emerson, H.E. Devereux and M.J. Ashworth, A Study of Fort St. Joseph**
 (1977; \$9.50, \$11.40 outside Canada)

- 15 **Karen Price, Glimpses of Soldiering at Coteau-du-Lac, Quebec - 1780 to 1856**
Karlis Karklins, Beads from the Fort at Coteau-du-Lac, Quebec
Paul McNally, Table Glass from the Fort at Coteau-du-Lac, Quebec
Ann Cunningham Falvey, Coins from the Fort at Coteau-du-Lac, Quebec
 (1977; \$8.25, \$9.90 outside Canada)

- 16 **Roger T. Grange, Jr., Cumulative Seriation and Ceramic Formula Dating: A Preliminary Study**
 (1977; \$4.25, \$5.10 outside Canada)

- 17 **Doris Drolet Dubé and Marthe Lacombe, Inventaire des marchés de construction des Archives nationales à Québec, XVII^e et XVIII^e siècles**
 (1977; \$8.00, \$9.60 outside Canada. Technical reference work available in French in the Histoire et archéologie series.)

- 18 Roger T. Grange, Jr., Early Fortification Ditches at Ile-aux-Noix, Quebec
(1977; 2 vols.; \$5.50 a set, \$6.60 outside Canada)
- 19 Roger T. Grange, Jr., Excavation of the Porter's Cottage, Civilian Barracks/Straw Shed, Northern Mounds and Rampart at Fort Lennox National Historic Park, 1966
(1978; \$5.50, \$6.60 outside Canada)
- 20 Norman F. Barka, The Archaeology of Fort Lennox, Ile-aux-Noix, Quebec, 1964 Season
Karlis Karklins, The Beads from Fort Lennox, Quebec
(1978; \$7.75, \$9.30 outside Canada)
- 21 Peter J. Priess, An Annotated Bibliography for the Study of Building Hardware
(1976; \$2.75, \$3.30 outside Canada)
- 22 Marcel Moussette, Fishing Methods Used in the St. Lawrence River and Gulf
(1979; \$6.75, \$8.10 outside Canada)
- 23 Claudette Lacelle, The British Garrison in Quebec City as Described in Newspapers from 1764 to 1840
(1979; \$4.50, \$5.40 outside Canada)
- 24 Lynne Sussman, The Ceramics of Lower Fort Garry: Operations 1 to 31
(1979; \$8.00, \$9.60 outside Canada)
- 25 Peter J. Priess, A Study of Surface-Mounted Door Locks from a Number of Archaeological Sites in Canada
Robert J. Burns, Inverarden: Retirement Home of Fur Trader John McDonald of Garth
(1979; \$8.00, \$9.60 outside Canada)
- 26 Jean-Pierre Proulx, The Military History of Placentia: A Study of the French Fortifications
Jean-Pierre Proulx, Placentia: 1713-1811
(1979; \$8.00, \$9.60 outside Canada)
- 27 Jeanne Alyluia, Nineteenth-Century Glassware from the Roma Site, Prince Edward Island
Barbara J. Wade, Cutlery from the Roma Site, Prince Edward Island
(1979; \$7.25, \$8.70 outside Canada)
- 28 Allan Greer, The Soldiers of Isle Royale
(1979; \$5.00, \$6.00 outside Canada)
- 29 Paul McNally, French Table Glass from the Fortress of Louisbourg, Nova Scotia
Jane E. Harris, Eighteenth-Century French Blue-Green Bottles from the Fortress of Louisbourg, Nova Scotia
(1979; \$7.50, \$9.00 outside Canada)

- 30 Kenneth E. Kidd, Glass Bead-Making from the Middle Ages to the Early 19th Century
(1979; \$5.00, \$6.00 outside Canada)
- 31 Geneviève Guimont Bastien, Line Chabot, Doris Drolet Dubé, Inventaire des dessins architecturaux aux archives de l'université Laval
(1980; \$20.00, \$24.00 outside Canada. Technical reference work available in French in the Histoire et archéologie series.)
- 32 Robert Caron, Inventaire des permis de construction des archives de la ville de Québec, 1913-1930
(1980; 3 vols.; \$40.00 a set, \$48.00 outside Canada. Technical reference work available in French in the Histoire et archéologie series.)
- 33 Christine Chartré, Jacques Guimont, Pierre Rancour, Répertoire des marchés de construction et des actes de société des Archives nationales du Québec à Trois-Rivières, de 1760 à 1825
(1980; \$13.25, \$15.90 outside Canada. Technical reference work available in French in the Histoire et archéologie series.)
- 34 Christine Chartré, Jacques Guimont, Pierre Rancour, Répertoire des inventaires et des inventaires après décès des Archives nationales du Québec à Trois-Rivières, de 1760 à 1825
(1980; \$23.25, \$27.90 outside Canada. Technical reference work available in French in the Histoire et archéologie series.)
- 35 Roger T. Grange, Jr., Mr. Thomas McVey's Dwelling House: A Residence on Ile aux Noix, Quebec
(1980; \$11.00, \$13.20 outside Canada)
- 36 Roger T. Grange, Jr., Excavation of the Right Redoubt and Blockhouse, British Fortifications at Ile aux Noix, Quebec (Forthcoming)
- 37 David Flemming, Fort Mississauga, Ontario (1814-1972) (Forthcoming)
- 38 Gérard Gusset, Stoneware: White Salt-Glazed, Rhenish and Dry Body
(1980; \$13.50; \$16.20 outside Canada)
- 39 The Yuquot Project, Vol. 1
John Dewhirst, The Indigenous Archaeology of Yuquot, a Nootkan Outside Village
(1980; \$15.00; \$18.00 outside Canada)
- 40 William Beahen, Development of the Severn River and Big Chute Lock Station
(1980; \$5.25; \$6.30 outside Canada)
- 41 Roch Samson, Fishing at Grande-Grave in the Early 1900s
(1980; \$6.75; \$8.10 outside Canada)

- 42 Louise Trottier, *Les Forges du Saint-Maurice: Their Historiography* (1980; \$11.00, \$13.20 outside Canada)

CANADIAN HISTORIC SITES
OCCASIONAL PAPERS IN ARCHAEOLOGY AND HISTORY

This series is also available in Canada through authorized bookstore agents and other bookstores, or by mail from the Canadian Government Publishing Centre, Supply and Services Canada, Hull, Québec, Canada K1A 0S9.

- 1 John H. Rick, Archaeological Investigations of the National Historic Sites Service, 1962-1966
K.E. and M.A. Kidd, A Classification System for Glass Beads for the Use of Field Archaeologists
Margaret Coleman, The Roma Settlement at Brudenell Point, Prince Edward Island
(1974; \$4.00, \$4.80 outside Canada; reprint)
- 2 Contributions from the Fortress of Louisbourg - No. 1
Edward McM. Larrabee, Archaeological Research at the Fortress of Louisbourg, 1961-1965
Bruce W. Fry, A "Rescue Excavation" at the Princess Half-Bastion, Fortress of Louisbourg
Iain C. Walker, An Archaeological Study of Clay Pipes from the King's Bastion, Fortress of Louisbourg
(1976; \$4.00, \$4.80 outside Canada; reprint)
- 3 Charles E. Cleland, Comparisons of the Faunal Remains from French and British Refuse Pits at Fort Michilimackinac: A Study in Changing Subsistence Pattern
David Lee, The French in Gaspé, 1534 to 1760
Walter A. Kenyon, The Armstrong Mound on Rainy River, Ontario
(1970; out of print)
- 4 Dale Miquelon, A Brief History of Lower Fort Garry
George C. Ingram, The Big House, Lower Fort Garry
George C. Ingram, Industrial and Agricultural Activities at Lower Fort Garry
William R. Morrison, The Sixth Regiment of Foot at Fort Garry
William R. Morrison, The Second Battalion, Quebec Rifles, at Lower Fort Garry
(1975; \$4.00, \$4.80 outside Canada; reprint)
- 5 James V. Chism, Excavations at Lower Fort Garry, 1965-1967; A General Description of Excavations and Preliminary Discussions
(1972; out of print)
- 6 Hugh A. Dempsey, A History of Rocky Mountain House
William C. Noble, The Excavation and Historical Identification of Rocky Mountain House
(1973; out of print)
- 7 Edward B. Jelks, Archaeological Investigations at Signal Hill, Newfoundland, 1965-66
(1973; \$3.00, \$3.60 outside Canada)

- 8 John P. Heisler, *The Canals of Canada*
(1973; out of print)
- 9 Edward F. Bush, *The Canadian Lighthouse*
Paul McNally, *Table Glass Excavated at Fort Amherst, Prince Edward Island*
Susan Bugey, *Halifax Waterfront Buildings: A Historical Report*
(1974; \$7.75, \$9.30 outside Canada)
- 10 Barbara A. Humphreys, *The Architectural Heritage of the Rideau Corridor*
Jane E. Harris, *Glassware Excavated at Fort Gaspereau, New Brunswick*
Edward F. Bush, *Commissioners of the Yukon, 1897-1918*
(1974; out of print)
- 11 Carol Whitfield, *The Battle of Queenston Heights*
Robert S. Allen, *A History of Fort George, Upper Canada*
Victor J.H. Suthren, *The Battle of Châteauguay*
(1974, \$5.00, \$6.00 outside Canada)
- 12 *Contributions from the Fortress of Louisbourg - No. 2*
Charles S. Lindsay, *Lime Preparation at 18th-Century Louisbourg*
Charles S. Lindsay, *Louisbourg Guardhouses*
T.M. Hamilton and Bruce W. Fry, *A Survey of Louisbourg Gunflints*
(1975; \$5.00, \$6.00 outside Canada)
- 13 Hilary Russell, *All That Glitters: A Memorial to Ottawa's Capitol Theatre and Its Predecessors*
Jane E. Harris, *Glassware Excavated at Beaubassin, Nova Scotia*
Carol Whitfield, *Sir Sam Hughes (1853-1921)*
(1975; \$6.50, \$7.80 outside Canada)
- 14 Robert S. Allen, *The British Indian Department and the Frontier in North America, 1755-1830*
G.E. Mills and D.W. Holdsworth, *The B.C. Mills Prefabricated System: The Emergence of Ready-Made Buildings in Western Canada*
(1975; \$5.75, \$6.90 outside Canada)
- 15 Ivan J. Saunders, *A History of Martello Towers in the Defence of British North America, 1796-1871*
Donald A. Harris, *Report of the 1972 Archaeological Excavations of the Market Shoal Tower, Kingston, Ontario*
(1976; \$6.75, \$8.10 outside Canada)
- 16 Judith Beattie and Bernard Pothier, *The Battle of the Restigouche*
Paul McNally, *Table Glass from the Wreck of the Machault*
K.J. Barton, *The Western European Coarse Earthenwares from the Wreck of the Machault*
William Naftel, *The Cochrane Ranch*
(1977; \$5.00, \$6.00 outside Canada)

- 17 John Joseph Greenough, *The Halifax Citadel, 1825-60: A Narrative and Structural History*
(1977; \$6.00, \$7.20 outside Canada)
- 18 Contributions from the Fortress of Louisbourg - No. 3
Raymond F. Baker, *A Campaign of Amateurs: The Siege of Louisbourg, 1745*
Blaine Adams, *The Construction and Occupation of the Barracks of the King's Bastion at Louisbourg*
(1978; \$6.50, \$7.80 outside Canada)
- 19 Gordon Bennett, *Yukon Transportation: A History*
(1978; \$6.50, \$7.80 outside Canada)
- 20 Mary K. Cullen, *The History of Fort Langley, 1827-96*
L.G. Thomas, *Ranch Houses of the Alberta Foothills*
(1979; \$6.50, \$7.70 outside Canada)
- 21 Philip Goldring, *The First Contingent: The North-West Mounted Police, 1873-74*
Philip Goldring, *Whisky, Horses and Death: The Cypress Hills Massacre and its Sequel*
Edward F. Bush, *The Dawson Daily News: Journalism in the Klondike*
(1979; \$6.50, \$7.80 outside Canada)
- 22 Lynne Sussman, *Spode/Copeland Transfer-Printed Patterns Found at 20 Hudson's Bay Company Sites*
(1979; \$10.00, \$12.00 outside Canada)
- 23 Richard J. Young, *Blockhouses in Canada, 1749-1841: A Comparative Report and Catalogue*
David Lee, *Gaspé, 1760-1867*
(1980; \$10.00, \$12.00 outside Canada)
- 24 Christina Cameron and Janet Wright, *Second Empire Style in Canadian Architecture*
(1980; \$10.00; \$12.00 outside Canada)
- 25 Mathilde Brosseau, *Gothic Revival in Canadian Architecture*
(1980, \$10.00; \$12.00 outside Canada)